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The International Journal of Orthodontia and Oral Surgery

A Monthly Journal Devoted to the Advancement of the Sciences of Orthodontia, Oral Surgery, and Dental and Oral Radiography

Martin Dewey, D.D.S., M.D., New York
Editor-in-Chief

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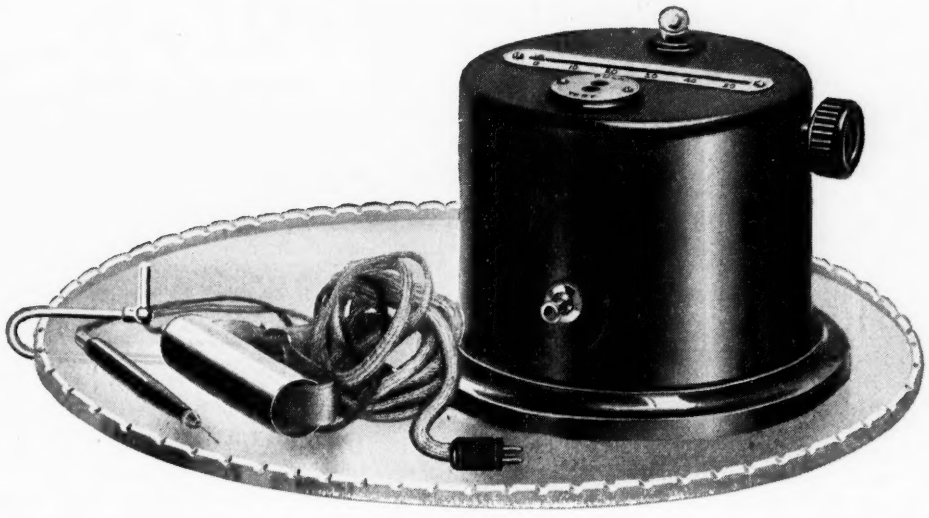

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VOL. VII ST. LOUIS, OCTOBER, 1921 NO. 10

ORIGINAL ARTICLES

MALNUTRITION AND LACK OF FUNCTION AS IMPORTANT CAUSES OF MALOCCLUSION*

BY S. E. JOHNSTON, D.D.S., PH.G., KANSAS CITY, MO.

IT has been wisely said that if we want a normal healthy child we should begin two generations back.

In stock breeding, we know the importance of choosing well developed animals to breed from. In our human relationships we very largely ignore these facts. This is necessarily true because all who are above an idiot in mentality may marry and beget children.

This places on the human family a large hereditary handicap. Important as hereditary consideration may be I am sure that feeding and environment are equally important.

Every epoch has its problems and I believe that dietetics is coming to the front today. Too large a percentage of us have seemed to think that we could filter through these bodies of ours any concoction or conglomeration that we can cultivate a taste for and still maintain health. For one hundred and fifty years germs have been studied as a causative factor in certain diseases. For almost fifty years the medical profession has accepted the germ theory of disease and treatment has been based on this conclusion.

Seemingly we have made some progress. There are specific remedies for diphtheria and typhoid fever. We have learned how to prevent yellow fever and many other diseases. But a look into our hospitals, alms-houses and asylums, which are all full to over-flowing, raises the question, how far have we gone in the control of disease?

Dr. Percy R. Howe, writing about the focal theory of infection in its application to the teeth, in the *National Dental Journal*, says:

*Read before the Alumni Society of the International School of Orthodontia, Kansas City, Mo., July 14, 1921.

"We are at present suffering from a professional neurasthenia. Every mole hill seems a mountain. We eliminate all other factors, such as normal living, a good sane diet, rest, fresh air, nervous disturbance, high tension living, and see only the infections.

"Let us hope that dentistry will maintain its sense of proportion, its equilibrium, and let us take a sound, broad and comprehensive view of the problems of physiology and of disease before the present ruthless sacrifice of teeth extends further."

There is another theory of disease, namely, autointoxication or food poisoning; in other words ptomaines or toxins developed in the body from undigested food. The food may have been pure and wholesome when taken, and most likely was, but was taken in excess of the digestive capacity at the time. This excess food simply spoils in the body the same as it would if kept on the pantry shelf at a temperature of 98½ degrees.

This theory holds that we build most of our diseases by over-working one organ or another by the use of an unbalanced diet or improper care of our bodies, often by the abuse of our body functions.

One of the great mysteries of life is the power of growth, that harmonious development of composite organs and tissues from simple protoplasmic cells, with the ultimate formation of a complex organism with its orderly adjustment of structure and function.

Equally mysterious is that wonderful power of rehabilitation by which the cells of the body are able to renew their living substance and to maintain their ceaseless activity through the period of a life time. That life time may be four score years or more. With these facts in mind do we not see the importance of food in sustaining life?

Without air, life is a matter of but a few minutes.

Without water, a few hours.

Without food, but a few days.

Dr. Tanner fasted forty days and came back to normal health. I think that is the best scientific fast we have recorded.

In the life and growth of the child food is even more important than in the adult. The adult simply requires food to replace tissue waste and supply energy for work. The child in addition must have food with proper materials to build new bone, muscle, blood and brain.

Bosc relates that the mortality among the infants in the public hospital at Tours has always been high, reaching 50 per cent in 1916, notwithstanding that the healthier children were boarded out in the country to be brought up on the bottle.

In 1916 new regulations were put into effect so that every woman delivered in the maternity was compelled to remain and nurse her child for three months. No applicant was received at the maternity unless she consented to stay afterward for three months. During this period her board and lodging is free and she is paid about twenty-five cents a day. She is thus the paid wet nurse for her own child. This is kept up as long as she will stay and nurse the child.

Since this regulation went into effect, 264 patients have been detained in this

way and the mortality among the infants has dropped from 50 per cent to 2.7 per cent.

There is no question but that nursing the breast is the normal way to feed the child. Modified cow's milk is the next best food, but the nursing bottle does not function like the breast.

Malocclusion is the result of a lack of bone development at the proper time.

As the time approaches for the eruption of the permanent teeth the maxillary bones and especially the alveolar process of the maxillary bones must develop fast enough to accommodate those teeth. If during the earlier life of the child there has been a period of arrested development it will show when the permanent teeth erupt.

At five years of age the crowns of the centrals, laterals, first molars, and canines are calcified beyond their widest part, therefore any arrested development of the child cannot affect the size of those teeth after that age.

Clinical observation bears out the statement that it requires a very severe disturbance of metabolism to affect the teeth but the development of the alveolar tissue seems to be rather easily arrested. This arrested development is the cause of malocclusion. Air and water, food and exercise in normal quantities and supplied in normal ways are necessary to normal growth.

The food must furnish all the elements for tissue building.

For some years we have been taught that the white flour did not contain the digestive ferments which are in the whole wheat; also that in pealing the potato we remove these same digestive ferments.

Later we have discovered another element that has been removed by this same process; namely, the vitamines. These are claimed to be the most vital element in tissue building. Without the vitamines in proper proportion in our food we cannot have normal health and growth.

Think for a moment what a large place bread and potatoes have in our diet. Then think again that as bread and potatoes are served on our tables nine times out of ten they are devoid of these vital elements. Whole wheat or graham flour should be used for bread. The potato should be baked and the whole potato eaten. The digestive ferments and vitamines are so close to the skin that they are lost in any other way of preparation.

LACK OF FUNCTION

I have called attention to the reduction of mortality in the maternity hospital at Tours by having babies breast fed. I want you now to consider the effect upon the development of the infant's maxillary bones in nursing from the breast, compared with drinking from a rubber tube or nipple. I have not gathered data from all my cases but from what I have, I find that a majority of them have been artificially fed or had only a few weeks of nursing at the breast.

Take this bit of scientific knowledge which I quote from a paper written by Dr. E. A. Bogue of New York City:

"Dr. Lawrence Baker of Boston ground off the teeth on one side of the mouth of several young rabbits and kept them ground off until they reached adult life, when the whole litter was killed and their skulls examined, with the

result that the left side of those skulls which had been deprived on the right of their masticating function were larger than the mutilated sides; the capacity of the brain box was greater and the general well-being of the animal was more marked upon the side where function had been properly performed than upon the mutilated side.

"This series of experiments found confirmation a short time afterwards in a series of experiments made in the University of Berlin by Landsberger on some puppies from a number of which he took the germs of the teeth on one side of the mouth so as to effectually inhibit the performance of function on that side, and the same results as were found by Dr. Baker in Boston occurred with him. The mutilated side where function was not performed was smaller when compared with the uninjured animals. It is, of course, impossible to prove that greater brain capacity would be any better in any individual case, but we may infer considerable along these lines."

If the deciduous set of teeth is not kept in health so that the child can perform the function of mastication in comfort he will not masticate his food.

How often have you upon examination of a mouth realized that it was impossible for the patient to masticate anything on one side of the mouth without causing pain?

How thoroughly would you masticate your food under those conditions?

What would you expect of a child?

We know that if a child cannot perform the function of mastication in comfort, he will swallow his food without mastication.

In closing let me repeat that malnutrition and lack of function are not only important causes of malocclusion, but, placed together, they are the most important cause.

DIRECT METHODS OF MAKING MOLAR BANDS*

By Herbert A. Pullen, D.M.D., Buffalo, N. Y.

STANDARDIZATION OF MATERIALS

THE materials used for the molar bands for anchorage for either labial or lingual arch should be so standardized that there is not such a wide variation in these materials in use all over the country as there is at the present time.

For example, the band material should be of gold and platinum which has a good edge strength and yet which can be easily burnished to the teeth. Pure gold is absolutely too soft, and even coin gold is not so desirable as a gold and platinum band material which has a higher fusing point.

QUALIFICATIONS OF BAND MATERIAL

The following qualities should be found in a good band material: 1. High fusing point; 2. Noncorrosive and nonoxidizing; 3. Good edge strength; 4. Capable of being easily burnished to the teeth.

1. *High Fusing Point.*—A high fusing point is needed to secure safety in soldering operations. Many of the samples of band material which have been placed on the market have been of a low fusing point, and this band material would often fuse before the solder, thus ruining the band. However, the best known manufacturers now furnish gold and platinum band material of a high fusing point. Iridioplatinum has the highest fusing point, and possesses all of the qualities of a good band material, but its cost is prohibitive for general use.

2. *Noncorrosive Materials.*—The use of the highly corroding and oxidizing German silver band material is on the wane, although there is still a large amount of this material used by those who do not understand the handicap they are under in its use. Gold and platinum band material will not corrode, and will not oxidize unless too much base metal is alloyed with it.

3. *Edge Strength.*—Edge strength is important and without it band material will continually bend instead of holding its shape while being forced between the teeth. Gold and platinum with a small percentage of silver and copper to give hardness, produces a band material of splendid edge strength.

4. *Burnishing Qualities.*—A band material which does not readily burnish to the teeth will spring away and will never perfectly fit the circumference of the molar. It is possible to obtain this quality combined with good edge strength in the best band material.

WIDTH AND THICKNESS OF BAND MATERIAL

Molar bands should be made of gold and platinum band material .007″ thick and .20″ wide for permanent molars. A slightly thinner band material may be used for temporary molars.

*Clinic before The American Society of Orthodontists, Atlantic City, April 30, 1921.

METHODS OF MAKING MOLAR BANDS

There have been two distinct methods of making plain bands for molars, the *indirect* and the *direct* methods.

The *indirect method* is one in which the molar band is made upon a plaster reproduction or a metal die of the tooth, all of the fitting and contouring being done in the laboratory, thus saving the operating time at the chair, although increasing the amount of work in the laboratory over the direct method.

DIRECT METHOD OF MAKING MOLAR BANDS

With the *direct method* the molar bands are fitted directly to the teeth in the mouth, and perfectly finished and contoured at the chair, an impression being

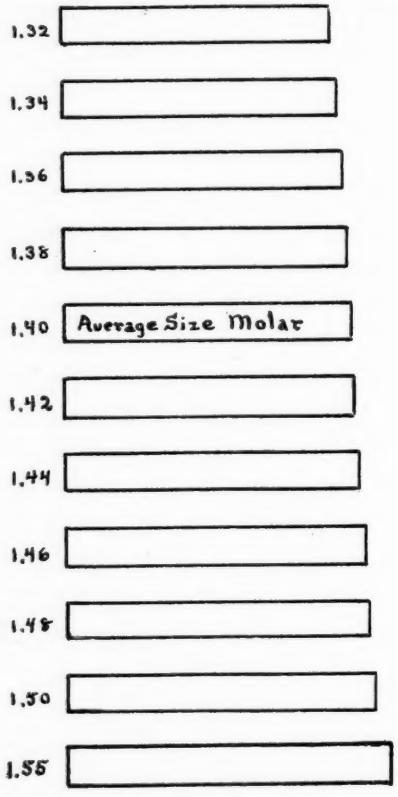


Fig. 1.

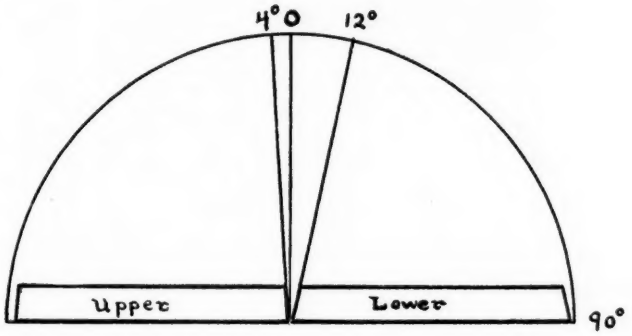
then taken with these bands in place, the bands replaced in the impression and an investment cast poured, all appliance attachments being made upon this investment cast in the laboratory. With an adequate supply of graduated sizes of maxillary and mandibular molar bands made up in stock, the minimum amount of time is consumed both at the chair and in the laboratory, especially if a technic, simplified to the last detail, is followed.

The writer has used the direct method to a considerable extent and has developed a simplified technic which may be described in sequence as follows:

GRADUATED LENGTHS OF BAND MATERIAL

The band material is cut as shown in Fig. 1, into eleven different lengths for the various sizes of permanent molars found, ten of these varying each .02″

in length from 1.32″ to 1.50″ for either maxillary or mandibular molars. An especially long one is made 1.55″ in length for unusually large molars. The bands are usually made up in pairs of the same length, as the molars on each side of the mouth are identical in size. It will be found also that the circumference of each of the four first permanent molars is the same, again simplifying the construction of the bands through the uniformity of sizes of the bands, although the flare of the bands for mandibular molars is considerably greater than for maxillary molars, which is prepared for by cutting deeper end angles on the mandibular molar bands than on the maxillary. It is possible to make up maxillary and mandibular molar bands with predetermined end angles for the average molars as will be shown.



Determining End Angles of Molar Bands.

Fig. 2.

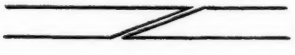


Fig. 3.

Fig. 5.

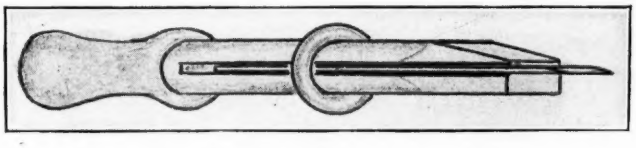


Fig. 4.

DETERMINING END ANGLES OF CUT BANDS

The ends of these cut bands should be trimmed to definite angles, Fig. 2, for maxillary and mandibular molar bands, the maxillary bands being cut to a 4° angle and the mandibular bands to a 12° angle, these angles giving the proper flare to the finished bands for the average molar teeth, both maxillary and mandibular.

BEVELING ENDS OF BAND MATERIAL

The ends of each length of band material are next beveled as in Fig. 3 so that when lapped, the joint will be a smooth one, and partially invisible.

The writer has adapted a jeweler's clamp, Fig. 4, to hold the band material rigidly so that the proper bevel may be made with a gold file, following the bevel on the end of the clamp.

BENDING BAND MATERIAL IN A CIRCLE

The beveled band lengths should be bent in a circle until the bevels overlap as in Fig. 5, and the writer has devised a plier, the beaks of which appear as in Fig. 5, to quickly bend the band lengths into circular form.

SOLDERING LAPPED JOINT

By fluxing the lapped joint and holding the band in a soldering clamp in the blowpipe flame, touching the joint with a piece of 18 to 22 K wire solder at the

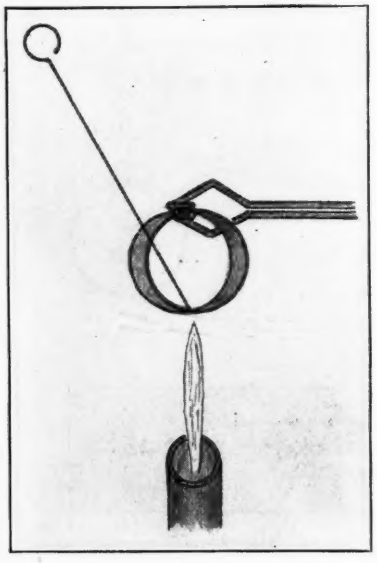


Fig. 6.

Fig. 7.

proper time, as illustrated in Fig. 6, will fuse the solder in the lapped joint when the band will be ready for trimming and contouring. The series in pairs of either maxillary or mandibular bands from 1.32″ to 1.55″, as shown singly in Fig. 7, may now be placed in small consecutively adjacent compartments in the cabinet designed for them, from which they may be selected to fit the various sizes of molars, and trimmed and contoured after such selection.

SELECTING PROPER SIZES OF MOLAR BANDS

The average first permanent molar is 1.40″ in circumference, this measure holding good for all four first molars, hence this size and the nearest approxi-

mating sizes, 1.38 and 1.42, will the most often be used from the made up stock and will have to be replaced more frequently. It is best to select the 1.40″ band first and slip it over the crown of one first molar and if it is too large try a band a size or two smaller, or if too small try a size or two larger.

A little experience will enable one to determine the proper size almost at a glance.

FITTING BANDS TO MOLAR TEETH

When the proper size of band is found, it should be flattened slightly mesially and distally with the flat nose pliers, and placed with soldered joint

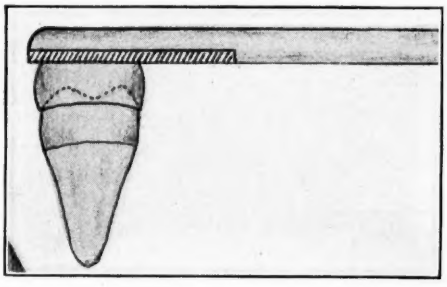


Fig. 8.

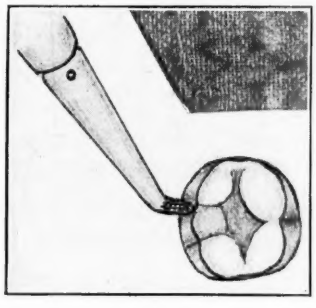


Fig. 9.

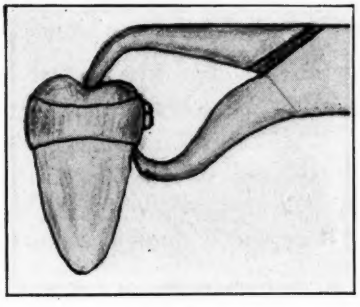


Fig. 10.

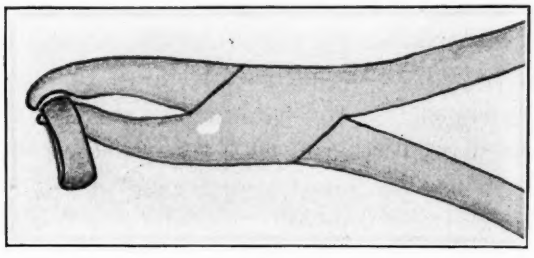


Fig. 11.

buccally over the crown of the molar, and with the band setting instrument should be forced between the proximate contacts of adjoining teeth, and rocked into place as far as the gingivæ as illustrated in Fig. 8. The writer uses an all metal band setter with a piece of pure tin soldered on the end as in Fig. 8 to catch the edge of the molar band and prevent slipping.

TRIMMING AND CONTOURING THE BANDS

While the molar band is in this position, it can be noticed whether it impinges upon the gum tissue mesially or distally and if so, it can be trimmed to relieve this impingement at once. The band should then be replaced upon the tooth, and burnished into all of the buccal and lingual grooves, with the serrated burnisher designed by Dr. J. Lowe Young, as illustrated in Fig. 9.

At no point should the band be allowed to cover over the occlusal surface of the molar as occlusion upon such overlapping edges wears away the cement and leaves a lodging place for food and detritus.

BAND REMOVING AND CONTOURING PLIERS

The band should next be removed with the band removing plier, Fig. 10, a design of the writer's, and contoured buccally and lingually with a special

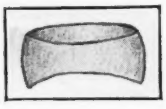


Fig. 12.

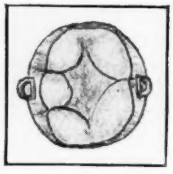


Fig. 13.

contouring plier, Fig. 11. The finished band, trimmed and contoured, should appear as in Fig. 12.

ANCHORAGE ATTACHMENTS

If the lingual or buccal arch is to be constructed upon these bands, the half round tubes should be soldered, as in Fig. 13, buccally and lingually, before the band is replaced upon the molar, so that these attachments will be in readiness in case either or both lingual and buccal arches are desired.

SEAMLESS BANDS

Seamless bands made in the same sequence of sizes and forms, partially contoured for maxillary and mandibular molars, would save considerable time in the following out of the technic in the direct method of fitting molar bands at the chair, and it is to be hoped that the manufacturers of band materials will not long delay the promised production of such ready made bands for the improvement of the technic.

PREVENTIVE ORTHODONTIA*

By C. M. McCauley, B.S., D.D.S., Los Angeles, Cal.

IN QUITE recent years the most familiar phrase among doctors was "remove the cause." Present day thought of the most advanced minds devoted to the healing art is toward prevention. Instead of waiting for a cause to produce a condition, and then treat the condition, the predominant idea is to discover the cause upon its appearance and remove it, thus preventing the condition. In preventive orthodontia one may go a step further. The etiologic factors which combine to bring about what is looked upon as the direct cause of many cases of malocclusion may often be obliterated before the visible cause appears in sight. That it is better to prevent than to cure, no one will question.

There are two outstanding reasons why preventive orthodontia should appeal most strongly to the consideration of all persons interested in prevention of general diseases:

1. Because of the vast importance to the general health and appearance of the individual. A large percentage of nose, throat, and sinus trouble would never occur. Caries of temporary teeth would be greatly diminished. Permanent teeth would be more immune to disease and mastication would be better performed. Better digestion and assimilation, and all the good things which result therefrom, would be ours. Pyorrhea of later years would be greatly diminished. Alveolar abscess and all its dreadful sequelæ would be lessened. The opsonic index would be kept higher and many childhood diseases of extra-oral origin would be avoided.

2. Because we know what the etiologic factors are in a majority of cases. They are of such a nature that we may see them before they actually become visible to the eye. They can always be detected when they appear and in many cases before. Yes, these causative factors may be known to the close observer oftentimes several years before the actual deformity appears. All of which makes it less excusable to leave them unobserved while Nature has tried in the face of too many difficulties to produce a good denture and failed.

Preventive orthodontia may be considered the basis of all prevention because it seeks to build perfect dentures, and perfect dentures are necessary to perfect digestion and assimilation. Besides that, when basic prevention is truly accomplished and a perfect denture completed, the mouth as a center of focal infection will be practically eliminated, and the nose and throat as factors in focal infection will be greatly reduced. The growth and development of the mouth and its tissues are so closely associated with the growth and development of the nasal passages and their tissues that the obstructions to normal processes originating in either organ will cause trouble in the other.

*Read before the Alumni of the International School of Orthodontia, Kansas City, July 14, 1921.

MORE MODERN CONCEPTION OF ORTHODONTIA

This specialty, in the earlier years of its existence, sought only to straighten crooked teeth and place them in alignment. In later years it embraced the science of occlusion. Advanced orthodontia of the present day covers not only the correct alignment of teeth in their arches, in a manner known as normal occlusion, but it seeks also to establish normal proportions in facial outline and to produce harmony in all facial features which owe their origin to dentofacial relations.

The orthodontist who has a true vision of the scope of his work, who sees the many factors in its etiology and appreciates the benefits to his patient made possible by inhibiting the action of or removing these factors, cannot avoid a deep feeling of responsibility to those who submit their cases to his judgment. Preventive orthodontia has many phases and will cover a larger field of work than that formerly done by orthodontists but its reward will also be greater. The patient who receives proper attention in this line of prevention will build an adequate foundation upon which the whole structure of health will rest, and it is difficult to conceive the great number of blessings resulting.

Normal development and prevention in orthodontia work side by side. Natural processes preside over normal development and when these processes fail it is the duty of the orthodontist to come to the rescue immediately when this failure occurs in tooth development, and render assistance. Such failures on the part of Nature in building the denture are due to pathological conditions. It therefore becomes the duty of the orthodontist to know or to learn when normal growth ceases and pathologic processes commence. In order to so differentiate he must be able to recognize the normal as well as the abnormal.

NORMAL DEVELOPMENT

Normal development of the denture depends primarily upon proper development of the individual. Also the proper functioning of the denture has great bearing upon general development. Primarily the development of the individual depends upon nutrition, environment and inheritance. Normal development is normal growth plus the organization of tissues to meet the demand of special function. Such development would be the result in all cases were it not for antagonizing forces from disease or malnutrition which interfere with normal denture building. This interference becomes stronger in its efforts to abort the processes of growth than are those forces of Nature which are trying to produce a perfect denture. When this happens, distortion and maldevelopment are the result. The purpose of preventive orthodontia is to recognize these antagonizing forces as soon as they appear and by artificial means supply the necessary stimulus to assist Nature in overcoming them.

SOME CONDITIONS ACCOMPANYING NORMAL DEVELOPMENT OF TEETH

Some of the physical forces which direct the teeth into correctly formed arches are the following:

1. The tongue and muscles of deglutition which influence the shape and curvature of the arches by outward pressure.

2. The muscles and cheeks which exert a pressure in the opposite direction from that of the tongue, thus establishing an area of equilibrium into which the teeth are at liberty to go.

3. The mouth closed and lips together, the lower lip overlapping the maxillary anterior teeth.

4. Well ventilated nasal passages for free passage of air.

5. Growth of the teeth and surrounding tissues in occlusal, forward and outward directions.

6. Long cusps and inclined planes of deciduous teeth which will develop the arches laterally if vigorous use is made of the teeth during mastication.

From the foregoing we may deduce the following along preventive lines:

1. Proper diet to influence normal growth. This applies not only to the child after birth, but to the mother before birth, and while nursing the child. The percentage of bottle fed babies who develop malocclusion is considerably larger than that of babies fed on human milk. Many cases of malocclusion due to malnutrition may be prevented by correct diet.

2. If deficiency in size of the jaw bone has resulted from errors in development, there will not be sufficient space for normal eruption of permanent teeth, and the result will be a crowded and irregular denture. When the permanent anterior teeth erupt normally, they appear in the arch in their right positions. About two years before eruption their growth begins to cause enlargement of the dental arches as shown by the spaces which appear between the anterior deciduous teeth. This enlargement is facilitated by the permanent teeth maintaining their right positions, with their longest diameters in the line of the arch. In other words if they do not maintain their right positions before and during eruption and stimulate the growth of bone as they should, some additional force is necessary. If the spacing fails to appear between the deciduous teeth at the proper time, namely between the fourth and sixth year, the case should be examined with the x-ray and if the permanent teeth are found to be crowded and irregular, treatment should be started at once. At this stage, treatment is usually more simple and easy than at any future time. Only slight pressure upon the lingual surfaces sufficient to stimulate the tissues slightly will cause the arches to widen and provide room for permanent teeth to erupt. This force may be applied with a small lingual bar or with any device which will apply the force in the right way. Oftentimes the maxillary arch will not require any attention as the expansion of the mandibular will expand the maxillary by means of the cuspal inclined planes in occlusion. It is possible to prevent serious cases of neutroclusion by this simple procedure if the case is discovered in time.

3. Hyperplasia of lymphoid tissue in the nasopharynx which closes the nasal passages and forces the mouth open for breathing, lays the foundation

at a very early age for malocclusion. These patients should have attention as early as possible, not later, however, than the fourth year. Proper treatment of such conditions administered early enough would prevent much trouble in later years.

4. All malocclusion resulting from loss of deciduous teeth from caries could be prevented if the child had proper attention at the right time. Caries may occur at any time after the eruption of the deciduous teeth. Therefore the age of prevention would begin at the time of eruption of these teeth. Surely four years of age is not too early to begin efforts to prevent caries. There is too great a tendency among the laity to neglect the first teeth of the children because they are regarded of little value. They are only deciduous according to their view point and will be lost in a few years any way. No need to have one filled because the filling will also be lost when the tooth goes. As a matter of fact, when the health of the child is considered, and the deciduous teeth are valued at their real worth as a factor in the foundation for future health of the individual, the deciduous denture is worth as much if not more than the permanent. Not only should each tooth be retained in its place until the proper time for its shedding, but each contact point should be maintained with utmost care. The matter of keeping the temporary denture intact and perfect in its function is one of the most important phases of preventive orthodontia.

We know the cause of a great many cases of malocclusion. There is no question about the cause in a multitude of cases. These causes can be removed or prevented if we only get the cases in time and handle them intelligently. If our literature contained more about ways and means of securing our patients earlier, about detecting deformities before they come into view from eruption of the second teeth and suggesting methods of preventive procedure at the right time, it would tend toward the elevation of the already high standard of the specialty. We take up too much space discussing appliances in our literature. Of course we must have appliances, but there is too much said about them to the exclusion of other things of importance. My experience with appliances has taught me that teeth are moved by a combination of appliance and personal element in the operator. The difference in the personal element tells us why one man gets results with one appliance and another man gets equally good results with an entirely different appliance. Each operator should use the appliance which, in combination with the personal element within him, secures the best results with the case in hand. Different movements of teeth require different methods of applying force, which fact makes it wise to use a different appliance when indicated. In the judgment of the writer it would be a good thing for our national society, or societies, to devote a meeting to discussions of preventive procedure, outlining the scope of the orthodontist's work as regards prevention. It is quite probable that such a meeting would change the character of our programs for the future.

CONCLUSION

A very large percentage of cases of malocclusion is the result of interference with Nature's processes of development at a time when orthodontia could render the assistance necessary to prevent the disorder. To do this successfully we should have our patients at a younger age than we are getting them now. Suppose we make an effort to secure the child for examination before the fourth birthday and if an abnormality is seen correct it or see that it is corrected, then watch the case at frequent and regular intervals thereafter until the permanent denture is correctly completed. If there is caries have it arrested. If there is loss of normal contact in temporary teeth have it restored. If prophylaxis is needed, see that it is provided. If movement of teeth is needed, do it now.

HISTORY OF ORTHODONTIA

(*Continued from page 269.*)

By Bernhard Wolf Weinberger, D.D.S., New York City

SIMION H. GUILFORD, A.M., Ph.D., D.D.S., 1841-1919.—In the first edition of the *American System of Dentistry* published in 1887, *Guilford* prepared the chapter on *Orthodontia,* pages 305-358. This article treated the subject more comprehensively than had yet been done by any author in this country, excepting Kingsley and Farrar's, whose work appeared the preceding year. Full descriptions were given of the various systems of correcting irregularities of the teeth, which had been brought to the attention of the profession by various men as well as some appliance original with *Guilford,* the article being illustrated with fifty-eight cuts and described in detail. "It also contained a formulated set of rules governing the application of force, and another set by which to determine whether or not extraction should be resorted to in cases presented for treatment."

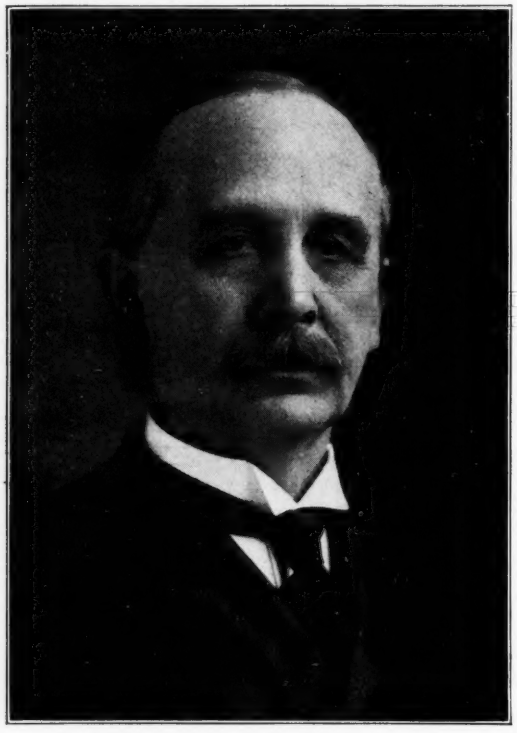


Fig. 1.—Simion H. Guilford. (1841-1919.)

Guilford's first edition of *Orthodontia* was published in 1889, at the request of the National Association of Dental Faculties, to be used as a text book

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in the schools of the Association. It was written for the student and not the practitioner, and with that in view the matter was arranged in progressive form, leading from the simplest beginnings up to the practical treatment of the most difficult cases. This was the first text book for students upon the subject of *Orthodontia* published, successive editions followed in 1893, 1898, 1905. Also transcribed in French and Spanish.

In the above chapter relating to orthodontia, *Guilford* states: "The teeth of man when in their normal position are arrayed in symmetrical order, side by side, their outline as a whole describing very nearly a parabola or semi-ellipse, their variation from these geometrical figures consisting principally in a slight flattening in the region of the incisor teeth, and a tendency to angularity in the region of the cuspids, owing to the marked prominence of these teeth.

"While this arrangement is generally regarded as normal and most in harmony with agreeable expression, it is nevertheless slightly variable in regard to the various national types, some having the outlines of the curve more flattened and angular, while others approach more nearly to the true parabolic curve.

"Whatever the national type, however, in respect to outline, the teeth, to be normally situated, must occupy their respective and regular position of this line. Any deviation from this constitutes what is known in dental science as an irregularity.

"Dental irregularities are usually of two general kinds: one, where certain individual teeth (one or many) stand out of line or are improperly placed in line, but where those still in place describe the normal outline of the particular jaw; the other, where the teeth all stand in line, but where their outline is so changed from a normal standard as to constitute a deformity or malformation. Either of these or a combination of the two is what generally calls for the interference of the dental practitioner.

"Irregularities, as to their origin, may be either *hereditary* or *acquired,* the one resulting from causes operating before the birth of the individual or the eruption of the teeth, and the other from circumstances attending their eruption or subsequent to it. * * *

"Whether the deviations from a normal standard, both in regard to the shape of the arch and the arrangement of the teeth in line, are more frequent now than formerly is an unsettled question in the minds of many; but certain it is that the subject of the correction of such deformities is steadily growing in importance and attracting an amount of attention that was formerly unknown. In the early days of the dental profession but little attention was given to this subject, both from its then seeming unimportance and from the great difficulties that attended its accomplishment, owing to the crude character and limited number of appliances then at command for dealing with it.

"Today, however, with the better knowledge of the character of the lesion and the multiplication and perfection of appliances, added to a greater facility of adapting the means to the end, the correction of irregularities has been greatly simplified, and with the means now at our command we are not only

able to bring about almost any desired change in the dental organism, but also to prognosticate our success with comparative certainty.

"Closely related, however, to the possibility of accomplishment is the advisability of it under certain circumstances; and in the determining of this, our action will necessarily have to be governed by certain attending conditions.

"Prominent among these are the age, sex, condition of life, health, family type, etc., of the patient. What may be the proper course to pursue under certain circumstances might be the improper one under other circumstances, and what may be advisable or expedient in one case might be totally inexpedient in another.

"Thus, in considering the question of the age at which the correction of an irregularity should be undertaken, we have to be governed largely by the character of the operation required. An operation might be undertaken very early in life of so extensive a character as to very severely tax the vital powers at a time when there is no life-force to spare, and where the results, if attained, would be hard if not impossible to retain. The same operation, delayed until a later period, when health and strength are better established, might not only be more easily accomplished, but attained with better results.

"So, too, an operation delayed too long may become associated with complications and difficulties that would have been avoided had it been undertaken earlier, when the treatment, in the nature of the case, would have had the element of prevention linked with it.

"The correction of irregularity can usually be begun and accomplished at any time between the eruption of the teeth and late in life, but the judgment of the operator will have to be exercised to determine at just what period of life it would be best to undertake it.

"Should the surrounding conditions favor it, the earlier the correction is taken, the better it will be in most cases. The bony tissues of the socket are then in their most pliable condition, making the labor easier and the time shorter; and the foramina for the entrance of the nutrient vessels being then quite large, there will be less liability to trouble from strangulation of the pulp and its consequent devitalization. The old rule that once prevailed of not beginning to correct an irregularity until all the permanent teeth were in place, for fear that the later arrivals by their crowding or pressure would disarrange those that had been brought into place, is now, we think, generally considered obsolete. True, such things may happen and have happened, but it is equally true that such a result may easily be prevented by the exercise of judicious care and watchfulness.

"Many years of attention to this subject, aided by a large experience, have firmly convinced the writer that wisdom and prudence alike dictate early interference in cases of irregularity. By this we would not be understood to mean meddlesome interference, for certainly such a thing is possible.

"There is a law of Nature tending strongly to harmony, and when accident or unusual circumstances bring about an irregularity in the dental arch, Nature will do all in her power to combat the opposing influences and bring about harmony. To enable her to do this it is necessary that she have time to accom-

plish it, and occasionally a little assistance from the dentist. Judicious interference is right and proper, but meddlesome interference will often only accomplish that which a little later Nature would have accomplished unaided.

"For instance, during the eruption of the permanent incisors, both superior and inferior (especially the latter), there often appears a slight irregularity. In most cases Nature by her strong inherent powers will correct this condition if time be allowed her; and it is certainly better in every respect, to allow her to do so than for us to unwisely interfere in the matter.

"So, too, a tooth is very often forced out of position or kept out by another tooth of less importance partly occupying its place. Nature alone cannot correct this condition of affairs, but if we aid her by removing the obstructing tooth she will in most cases, unaided (if the patient be young), bring the malposed tooth into line. * * *

"The surgery of the mouth, in the very nature of the case, is associated with many difficulties not met with in operating upon other portions of the human frame. Could we, like the general surgeon, perform our work heroically and at once by laying open the part, removing such tissue as we wish displaced, move the organs into the desired positions, fasten them there and bind up the part to give it rest and await the favorable action of Nature's recuperation, our labor would be greatly lessened. Such favorable conditions, however, are not vouchsafed us.

"Operations for the correction of irregularity must be slow and gradual in their character: instead of removing tissue that stands in our way, we must depend upon Nature to remove it by her slow method of absorption under the stimulus of pressure; the individual organs whose position we desire to alter are deeply and solidly implanted in a strong bony structure, and, aside from the mechanical difficulty of moving them, we must exercise the greatest care, for they are tender organs, and sudden violence offered them may easily result in their devitalization and possible loss; the pressure exerted to bring about the change we desire must be positive in its character, and continuous as well, and the appliance employed must not only be strong, but neat in character and occupy little space, so as not to interfere with neighboring organs. More than this, they must meet the hygienic conditions of the cavity in which they are placed by being made of such substances as shall not exert a deleterious influence upon the oral fluids and the stomach, nor yet rest unduly upon or irritate the soft tissues surrounding them, and thus bring on a morbid condition." * * *

Guilford's formulated rules governing the application of force were described as the following:

"In bringing malposed teeth into their proper places, certain movements must take place and proper forces be applied to bring about these movements. The movements generally required are either outward, inward, forward, backward, rotary, or general expansion, sometimes a combination of two or more of them being required. To cause these movements we must bring to bear forces sufficient to accomplish them; and this we do through the medium of such mechanical appliances as seem best to serve our purposes:

"According to well-known physical laws, *the greatest good can be obtained from any force only when it is exerted in a direct line with the movement desired.* * * *

"The force applied must be sufficient, but it should not be more than sufficient nor too abruptly applied. * * *

"The point of resistance and the point of delivery of the force must be fixed points. * * *

"The resistance at the point from which we exert pressure must be greater than the resistance to be overcome by the pressure. * * *

"Before applying force it should be seen to that there is space sufficient to accommodate the tooth in the new position it is to occupy. * * *

"Pressure may be either constant or interrupted. * * *

"Pressure should be exerted as nearly as possible in a line at right angles to the long axis of the tooth."

Guilford then described in detail the different methods in use up to that time, as well as the eruption and time of eruption of the teeth and laid down

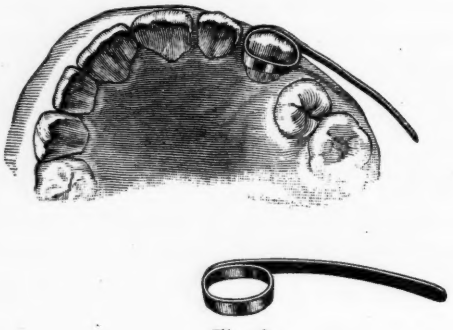

Fig. 2.

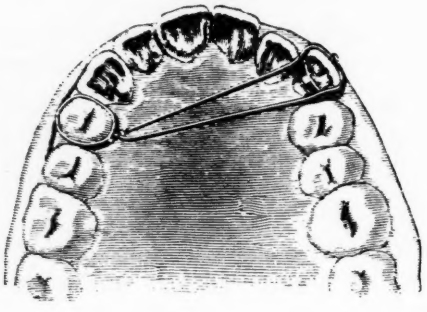

Fig. 3.

the following rules governing extraction as it pertains to the permanent teeth and the treatment of irregularity:

"Always avoid if possible, extracting any of the six anterior teeth in the superior arch. * * *

"In the lower jaw any of the incisors may without harm be extracted to gain space. * * *

"Back of the anterior teeth, if all are equally good and one must be removed, select the one nearest the posterior to the one out of position. * * *

"If a tooth other than the nearest to that in malposition be defective, and not too far distant from point of irregularity, extract it instead. * * *

"If a tooth must be lost, either to allow a more important one to fall into line or to create space, it should be done without delay to accomplish the best results. * * *

"If a tooth must be removed on one side to obtain space, it does not necessarily follow that its opposite mate should also be extracted. * * *

"Where there is disparity in size between the two jaws, and two teeth need to be extracted from the more prominent one, it would be a serious mistake to extract also the corresponding teeth in the other and smaller jaw. * * *

"If appearances indicate that certain teeth may have to be removed at some

time before the case is complete, though not in the beginning, perform all the work possible first, and then extract if necessary. * * *

"Needless extraction should be carefully guarded against. * * *

"If a crowded arch calls for or will admit of expansion to advantage, do this in preference to extracting."

The contents of *Guilford's* first edition of *Orthodontia or Malposition of the Human Teeth,* are divided into three parts. Part I, Principles Involved; Part II, Material and Method; Part III, Specific Forms of Irregularities and their Treatment. The greater part of the work treats of the methods of his predecessors. Under Part III, page 107, he states: *Specific Forms of Irregularity and Their Treatment.*

"While principles and methods may be well understood, illustrations of their application in certain forms of irregularity will be necessary in order that the student may properly comprehend their practical relationship.

Fig. 4.

"So far as ease or difficulty of treatment is concerned, cases of irregularity are naturally divided into two general classes; in one the cases are brought to our notice as soon as the irregularity begins to manifest itself, while in the other the deformity is fully established and confirmed before presentation for treatment. In the first class, occurring usually in children, we have the advantages of easy movement and freedom from complications; while in the second, we have to contend with slow and difficult movement and a variety of unfavoring conditions.

"For these reasons it is deemed advisable to treat of certain forms of irregularity, especially those involving the six anterior teeth of each jaw, under separate heads, according as they present before or after dentition is complete, for the treatment in one case will vary considerably from that required in the other." * * *

We do not find, however, a classification, although in this part he has divided the subject into ten chapters as follows:

1. Incisor Teeth Erupting Outside or Inside of the Arch.
2. Delayed or Mal-Eruption of the Permanent Cuspids.
3. Incisor Teeth Situated Outside or Inside the Arch After Dentition is Complete.
4. Cuspid Teeth Situated Outside or Inside the Arch.
5. Misplaced Bicuspids.
6. Torsion.
7. Contraction of the Arch.
8. Protrusion of the Upper Jaw.
9. Protrusion of the Lower Jaw or Prognathism.
10. Miscellaneous:
    Lack of Anterior Occlusion.
    Reduction of Elongation of the Anterior Teeth.
    Assisted Eruption of the Anterior Teeth, Tooth Shaping.

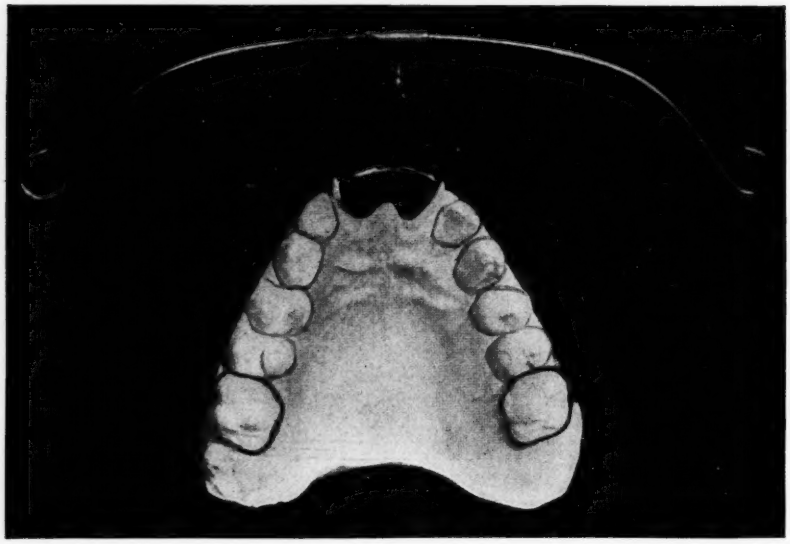

Fig. 5.

Not until the fourth edition in 1905 do we find any definite mention of a classification. Under Part III, Page 139:

"Classification of Irregularities and Practical Treatment."

"In the classification of irregularities it has seemed best not to base the varieties upon simple occlusion of the teeth but to arrange them into groups or classes, each class having certain distinctive characteristics; in any case it may easily be referred to its proper class, where all matters relating to its treatment will be found.

"Occlusion has much to do with both the causes for and the proper treatment of irregularities, but to base a system of classification entirely upon it would be at variance with the custom prevailing in other departments of natural science where marked physical characteristics, their correspondence

or their variation are made the basis for arrangement into separate order of classes.

"There are two natural general divisions which include all forms of irregularity commonly met with.

"The first of these is 'Simple Irregularities,' including all those lesser malpositions in which few teeth are involved and where such malposition bears no important relation to facial harmony.

"The second division is 'Complex Irregularities,' which must include all cases where there is extensive malposition of the teeth or jaws and corresponding dento-facial deformity."

Division I.

Simple Irregularities

Class 1. Labial and Lingual Malposition
Class 2. Mesial and Distal Malposition
Class 3. Extrusion and Intrusion
Class 4. Torsion

Division II.

Complex Irregularities

Class 1. Malposition of Anterior Teeth
- A. Normal Buccal Occlusion
- B. Abnormal Buccal Occlusion { Unilateral / Bilateral

Class 2. Upper Protrusion
- A. Lower Normal
- B. Lower Retruded

Class 3. Lower Protrusion
- A. Upper Normal
- B. Upper Retruded.

Class 4. Upper Retrusion—Lower Normal
Class 5. Lower Retrusion—Upper Normal
Class 6. Bimaxillary Protrusion.
Class 7. Nonocclusion

The following is a list of *Guilford's* most important articles:

"Orthodontia Technology," *Items of Interest,* 1904, p. 501.

"When Is Radical Treatment—Orthodontia Justifiable?" *Items of Interest,* August, 1905.

"Extraction—When Justifiable in Connection with Orthodontia Operations," *Dental Cosmos,* Sept., 1905.

"Nomenclature in Orthodontia," *Dental Cosmos,* February, 1906.

"Methods of Teaching Orthodontics to Dental Students," *Dental Cosmos,* March, 1916.

DEPARTMENT OF
DENTAL AND ORAL RADIOGRAPHY

Under the Editorial Supervision of

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It is the object of this department to publish each month original articles on dental and oral radiography. The editors earnestly request the cooperation of the profession and will gladly consider for publication papers on this subject of interest to the dental profession. Articles with illustrations especially solicited.

RADIOGRAPHY AND DENTAL AFFECTIONS*

BY J. G. EDWARDS, M.B., M.S., AND W. A. EDWARDS, M.B., B.S.

Honorary Radiographers to the Sydney and St. Vincent's Hospitals

THE radiographic method of examining dead and devitalized teeth has become general practice only during the last few years. For many years we have been making examinations of such conditions as fracture, new growth, impacted and unerupted teeth, but such examinations have been made at the request of the general surgeon and not the dental surgeon. At the present time no dentist can be considered up to date in his work unless he avails himself of the help of the radiologist.

We do not intend to devote much time to the description of apparatus tonight; any moderate sized outfit can be utilized as long as exposures do not exceed about fifteen seconds; if exposure be too prolonged, blurring will be caused owing to the inability of the patient to keep perfectly still.

We use Buck's "X-ograph" films exclusively and find a diaphragm designed by ourselves of great use in preventing distortion.

The film is placed in the mouth and held against the lingual surface of the tooth, the tooth and alveolus coming between the film and the tube; the incident rays should strike the film almost at right angles and with a little practice it is easy to prevent distortion. If the tube is tilted too much foreshortening of the teeth appears in the picture and if the skiagram is taken with the tube too perpendicular to the skin surface, elongation of the teeth in the resultant image is produced.

It is a good practice not to attempt to get too many teeth on one film. We aim to get two teeth only.

For the lower teeth we use a Leach's film holder, as it allows the film to be placed low in the space between the teeth and the tongue.

*Read at a Meeting of the New South Wales Branch of the British Medical Association on May 27, 1921.—Reprinted from the Medical Journal of Australia, August 20, 1921.

Radiography is not dangerous to the patient if care be taken not to make repeated exposures over the same skin area, while if a millimetre of aluminium is placed between the tube and the patient, several exposures may be made with safety. Operators should on no account hold the films in place during an exposure; the patient should be made to do this. I have seen many cases of radiodermatitis from neglect in this respect.

Shocks from high-tension currents are not dangerous, but it is as well to carry all wires high up and out of reach of any possible contact with the patient.

Great attention has recently been paid to the possibility of many systemic diseases being due to absorption from septic foci; the commonest sources of such absorption are the genitourinary tract, colon, sinuses of the head, and teeth. Clinical examination will generally reveal trouble in all these sites with the exception of the teeth. The teeth may be extensively involved, yet the most careful dental examination will not reveal any trouble and such trouble would be overlooked unless the teeth were subjected to radiographic examination.

Periapical abscess and pyorrhea are the two great dental troubles and of the two the periapical abscess is the more dangerous, as the only possibility of drainage is into the general circulation, while in pyorrhea there is always a certain amount of drainage from the gum margins. The failure of chronic periapical abscesses to cause any symptoms is very common and patients will not believe that there is any trouble about their teeth, while many dentists refuse to believe that teeth are diseased unless they can find corroborative clinical evidence, such as pain or tenderness. They often persist in this belief in the presence of undoubted radiographic evidence that such trouble exists.

If a dentist persists in ignoring positive radiographic evidence, how is he to diagnose the presence of periapical disease?

Crowned, pivoted and pulpless teeth are potential sources of trouble and in ill health they should be subjected to early and thorough radiographic examination. It is also well to examine all areas from which teeth have been extracted, as in many cases buried septic roots are found. No tooth should be crowned or dealt with in any way before a radiographic examination has been made; if this were done a great many teeth would never be crowned or pivoted.

Sir William Hunter wrote as follows over ten years ago:

Gold fillings, gold caps, gold bridges, gold crowns and fixed dentures, built in, on or around diseased teeth, form a veritable mausoleum of gold over a mass of sepsis, to which there is no parallel in the whole realm of medicine or surgery.

According to Duke, fully 50 per cent of devitalized teeth show periapical sepsis and a greater percentage of crowns, pivots, fillings and bridges project sufficiently to irritate the gums and leave pockets for sepsis.

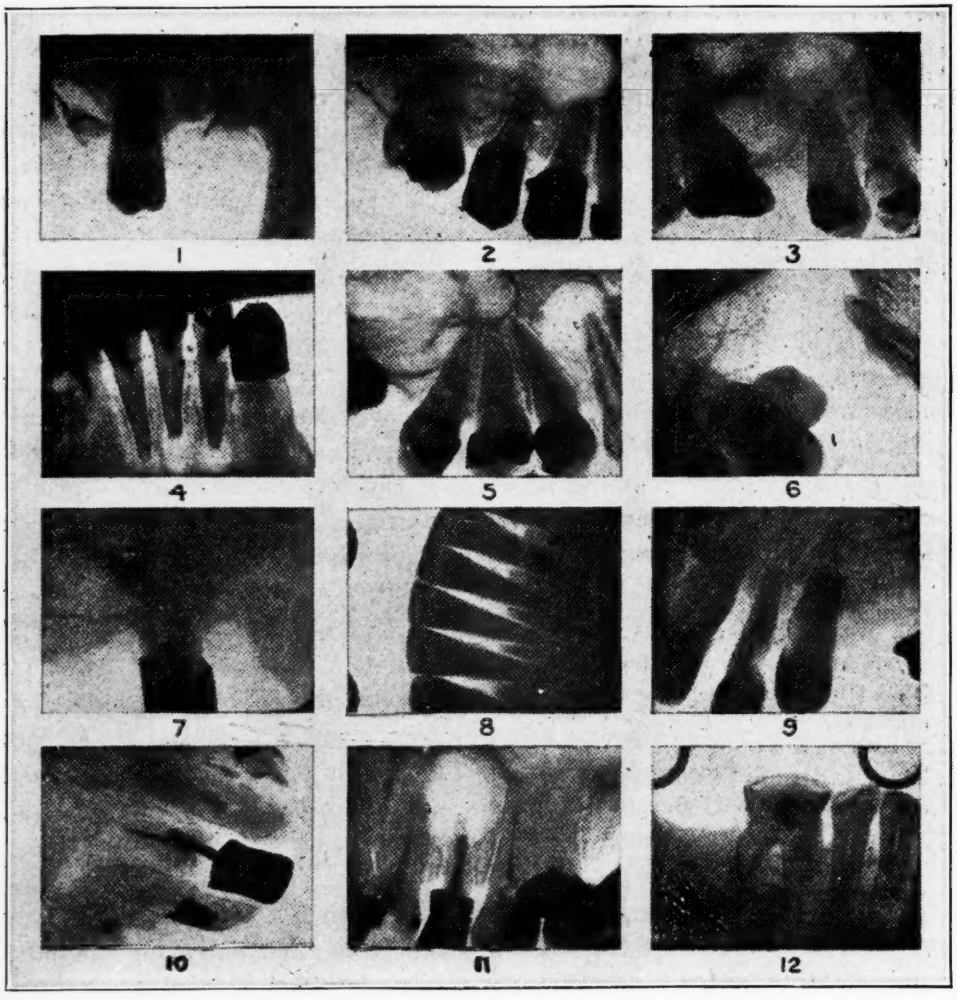
Thoma reports 88 per cent of alveolar abscesses in a large series of patients suffering from various chronic maladies.

Irons reports 77 per cent of alveolar abscesses in persons suffering from chronic arthritic conditions in a large hospital practice, while in a thousand consecutive cases at one medical clinic, Duke found septic foci in 66 per cent. These figures show how common such infections are.

Now, in regard to the interpretation of the radiograms.

Physicians and surgeons have gradually come to recognize that interpretation is an extremely difficult accomplishment and agree that only skilled radiologists can give any opinion of value on a skiagram. Some dentists, however, still consider themselves greater experts at interpretation than the radiologist. The radiologists hope one day to convert them.

A dentist in active practice cannot give sufficient time to the subject to become efficient at interpretation and it is not possible for a man in a single prac-



1.—Septic changes about retained stumps.
2.—Proximity of bicuspid roots to antrum.
3.—Low position of antral floor between bicuspid and molar teeth.
4.—Periapical septic foci.
5.—Large periapical septic focus.
6.—Large dental cyst.
7.—Capped tooth with shadow of coronoid process of mandible (often mistaken for a molar tooth).
8.—Pyorrheal involvement of alveolus.
9.—Pyorrheal involvement of alveolus with dental caries.
10.—Ill-fitting pivot tooth.
11.—Dental cyst.
12.—Septic process between the roots of a lower molar.

tice to see a sufficient variety of cases to allow of him giving an authoritative opinion, in any but the simplest case.

The best method of procedure is for the patient to be examined and reported

upon by an expert radiologist and one engaged only in the practice of radiography, whether he be a medical or dental graduate. When general systemic diseases are in question, the medical man can give a far more valuable opinion than the dentist, owing to his wider training in general pathological conditions and to the fact that he is not walled in by a narrow specialty as is the dental surgeon. Beginners in radiography are apt to be overenthusiastic in their interpretations, but as they grow older, they become more conservative in their opinions and recognize that affected teeth may occasionally be treated by methods other than extraction. Erroneous interpretation means wrong treatment and consequent bad results, which tend to discredit radiography and account for much of the lack of appreciation shown for it.

There are men in practice who are frankly hostile to radiography and try on all occasions to belittle it. They extract the affected tooth and triumphantly display it to the patient, stating that it is normal! Such men display total ignorance of dental pathology, for periapical sepsis is an affection of the periapical bone and not of the tooth root.

Good films are necessary for sound interpretation and the original films only should be viewed; prints are valueless.

A knowledge of the normal appearance of the teeth at all ages is necessary and the interpreter should be conversant with all abnormalities consistent with good health. In skiagrams the normal alveolus shows as a fine lacework with a more condensed fine white line about the tooth socket, while between the socket and the tooth there is a very fine dark line due to the presence of the peridental membrane. Between the upper incisors normally a more transparent area of bone, known as the anterior palatine fossa, is frequently found, while further back the antrum of Highmore appears as a dark area above and about the roots of the premolar and molar teeth. The antrum varies greatly in shape and extent and the tooth roots often appear to project into the antrum, being covered only by a very thin layer of bone. This antral shadow is very frequently diagnosed as a large area of periapical absorption or as a dental or dentigerous cyst.

The coronoid process of the mandible is frequently seen in skiagrams of the upper molar region and it is often interpreted as a tooth or retained root process.

The mental foramen and the dental canal in the lower jaw are also frequently misinterpreted as septic foci.

The lesions met with in the examination of the jaws may be either acute or chronic. The acute processes are of little interest to us, though of absorbing interest to the patient. They usually are confined to one tooth and rapidly progress to abscess, drainage of which leads to cure. The best method of drainage is probably through the socket after extraction of the tooth, but for some unknown reason a dental surgeon can rarely be persuaded to extract a tooth in the presence of an acute process, although it is a surgically sound procedure.

Chronic infections are divisible into two classes:

(*i.*) Periapical infections, due to the introduction of sepsis through the root canal;

(*ii.*) Pyorrheal infections due to the entrance of microorganisms form the gum margin.

Pyorrhea alveolaris (chronic osteopericementitis) is due to many causes acting together and producing irritation at the gum margins and allowing of the entrance of micro-organisms. Malocclusion, chronic irritation and decay, defective dental work and pocketing of food particles are the commonest exciting causes. When certain organisms commence their growth in the inflamed gum we have a gingivitis, which, if untreated, proceeds to extend deeply and involves the alveolus and peridental membrane. Streptococci, pneumococci, amebæ, spirochetes and various putrefactive organisms are found in these pyorrheal affections. The extension of the disease leads to destruction of the alveolus and loosening of the teeth; extraction or loss of the tooth provides drainage and cure.[1]

Infections through the root canal are secondary to the death of the pulp, whether as the result of ordinary decay or as the result of intentional dental interference in the process of devitalization. It is absolutely impossible to carry out root canal fillings without occasionally introducing sepsis; the organism which is introduced, is in the majority of instances the streptococcus.

The introduction of strong antiseptics, such as arsenic and formaldehyde, causes wide destruction of the periapical tissues and any implanted organisms rapidly grow at a good incubation temperature. This periapical inflammatory change causes death of the bone and the dead area shows in the skiagram as a small rarefied area. Such an area is evidence of disease and in invalids especially it should receive early treatment and drainage.

Streptococci of high virulence rapidly produce abscess with early discharge of pus, but when of low virulence, the process is slow and a space forms about the apex filled with granulation tissue (granuloma); streptococci can be obtained in pure culture from this area. This granuloma may break down and form a thin fluid pus and the condition is then generally referred to as a chronic abscess. This process may or may not be accompanied by absorption and roughening of the tooth root or by a gradual deposit of new cement about the root (hypercementosis or exostosis).

Periapical areas of absorption have no limiting membrane as is usual in abscesses elsewhere, but communicate directly with the blood stream through the Haversian system and the products are easily absorbed.

In the more chronic cases there is a proliferation of the squamous cells of the peridental membrane about the apex and in the periapical inflammatory tissues. These break down (a process of fatty degeneration) in the center and a space is left filled with a clear fluid which gradually extends, causing pressure on and atrophy of the peripheral cells until finally a dense fibrous capsule forms (the dental cyst). The contents of these cysts are sterile and are not a source of septic infection; they only cause trouble when they involve several teeth, causing neuralgia or loosening of the teeth.

Organisms harboured in these chronic foci may remain localized, but should

[1]Numerous skiagrams were projected on the screen to illustrate the various stages in this condition in pyorrhœal infection.

any part of the body offer a lowered resistance, they find abundant opportunity to cause disturbances at a distance from the original focus.

In regard to treatment, I have little to say. Conservative treatment should never be attempted in invalids; in strong and vigorous individuals it may be attempted in selected cases, but should be frequently checked by radiographic examination.

Root amputations have in my experience rarely succeeded and should only be attempted in the case of the anterior upper teeth.

Teeth should be invariably extracted when a septic focus involves more than one tooth or is close to the antrum.

In pyorrheal cases there is no hope of saving a tooth when more than half the supporting alveolus has been absorbed or when the process has extended between the roots of one of the molars.

Lower teeth need extraction oftener than upper teeth, owing to the difficulty of providing drainage through the root canal.

In conclusion, although these troubles occur almost always in crowned, pivoted and root-filled teeth, it does not follow that these methods of treatment should be abandoned. The causes of failure are twofold, firstly, faulty technic and, secondly, faulty judgment.

Faulty technic is rarely the cause, but faulty judgment is usually the cause. The faulty judgment consists in attempting reconstructive dentistry on diseased teeth. If every tooth were radiographed before crowning or pivoting, the number of cases of periapical sepsis would be enormously decreased.

PATENTS

DENTAL PLIERS, PATENTED MAY 27, 1919*

THIS invention relates particularly to that type of dental pliers used in placing bands upon teeth, and in shaping the band material about the tooth to be fitted.

The main object of the invention is to provide a pliers of the class described adapted to conveniently and firmly grasp the two ends of the band material, and to hold it while it is being shaped about the tooth.

Another object of the invention is to provide in a pliers of the class described, means whereby the two ends of the band material will be accurately held, and to prevent them from slipping or sliding one over the other, during the act of clamping or gripping them with the pliers.

In the drawing, Figure 1 is a side elevation of a pliers constructed in accordance with this invention, showing the jaws closed;

Fig. 2 a similar view, showing the jaws open;

Fig. 3 an edge view of the pliers;

Fig. 4 a detail sectional view taken on the line IV—IV of Fig. 1;

Fig. 5 an enlarged detail view, showing the plier jaws open and the band material in place between them; and

Fig. 6 a view similar to Fig. 5, showing the jaws closed and the band material clamped between them.

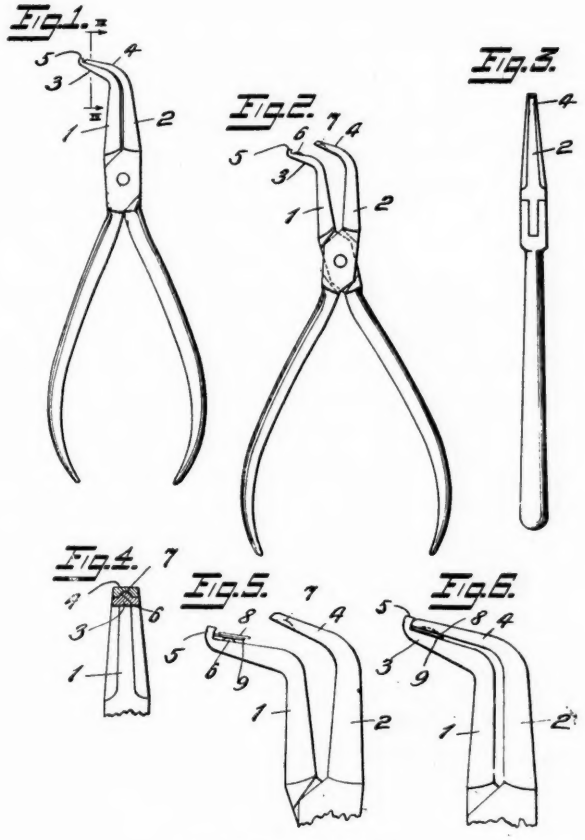
Referring to the various parts by numerals, 1 and 2 designate the jaws of the pliers, said jaws being carried by the usual handle members which are crossed and pivoted together in any well-known manner. The jaw 1 is provided at its outer end with a laterally extending beak 3; and the jaw 2 is provided with a corresponding laterally extending beak 4 which is adapted to be brought into engagement with the beak 3 when the jaws are brought together. The beaks 3 and 4 are in the same plane with the jaws, the jaws and the beaks lying in a plane transverse of the axis of the pivot.

The beak 3 at its free end is formed with an outwardly extending stop lug 5; and a short distance inwardly from said lug it is formed on its clamping face with a gripping lug 6. The beak 4 is provided on its inner or clamping face with a slight depression 7, adapted to receive the gripping lug 6 of the opposite clamping beak. When the jaws and beaks are brought together into clamping position, the end of the beak 4 will abut against the stop lug 5, and the gripping lug 6 will be received in the recess 7, as shown clearly in Figs. 4 and 6.

In using the pliers the two ends of the banding material 8 and 9, are brought together on the clamping face of the beak 3, and over the gripping lug 6, as shown in Fig. 5. The clamping jaws and the beaks are then brought together,

*Patent No. 1,304,720, United States Patent Office.

and because of the peculiar movement of the beaks in approaching each other, the two ends of the band material will be forced against the stop lug 5 and finally gripped tightly by the gripping lug, indenting the band material into the recess 7. The stop lug insures the two ends of the band material being accurately placed one over the other, said lug forming a stop which is adapted to be engaged by the edges of the two end portions of the said material. The stop lug also serves as a guide to the operator in placing the band material on the clamping surface of the beak 3, said lug serving in the nature of a gage. If in placing the two end portions of the band material on the beak 3 the said edges should



1,304,720—Dental Pliers.

not be accurately alined with the stop lug, they will be brought against said stop lug by the gripping action of the beaks.

The position of the beaks with respect to the jaws and with respect to the handles of the pliers is important, as it enables the operator to conveniently place said beaks on the inner side of the tooth to be operated upon, and to securely and accurately hold the banding material while shaping it about the tooth.

What I claim is:

1. A dental pliers, comprising a pair of jaws and handles therefor, each of said jaws being formed with a laterally extending clamping beak, said beaks lying in the same plane as the jaws, said plane being transverse of the axis of

the pivot of said jaws, a stop lug formed on one of said beaks at the outer end thereof, said stop lug serving as a gage and as a stop for the other beak.

2. A dental pliers, comprising a pair of jaws and handles therefor, each of said jaws being formed with a laterally extending clamping beak, said beaks lying in the same plane as the jaws, said plane being transverse of the axis of the pivot of said jaws, a stop lug formed on one of said beaks at the outer end thereof, said stop lug serving as a gage and as a stop for the other beak, a gripping lug carried by one of said beaks, and a recess formed in the other beak to receive said gripping lug.

3. A dental pliers, comprising a pair of jaws and handles therefor, each of said jaws being formed with a laterally extending clamping beak, said beaks lying in the same plane as the jaws, said plane being transverse of the axis of the pivot of said jaws, a stop lug formed on one of said beaks at the outer end thereof, said stop lug serving as a gage and as a stop for the other beak, a gripping lug formed on the beak carrying the stop lug and a recess formed in the other beak to receive said gripping lug.

ORTHODONTIA APPLIANCE, PATENTED MAY 27, 1919*

THIS invention relates to improvements in orthodontia appliances or tooth-regulating and retaining appliances of the arch wire type. Appliances of this type comprise a curved arch wire or delivery member of approximately the same form as the dental arch, means for connecting the delivery member to a tooth or teeth to be treated, and means for anchoring the delivery member at or adjacent its ends to suitable anchor teeth, such as molars. The movement of the malposed tooth or teeth to normal position in the dental arch is accomplished by distending, shifting or contracting the arch wire or bar relatively to the anchoring means either by shifting the arch wire bodily relatively to the anchoring means by adjusting nuts threaded on the wire, as shown, for example, in the patent to Angle, No. 626,476, dated June 6, 1899, or by altering the length of the arch wire by bending, crimping, or stretching the wire, as shown, for example, in the patent to Angle and Young, No. 1,005,131, dated October 10, 1911.

The present invention has for one of its objects the provision of more efficient means for detachably locking the arch wire or delivery member to the anchor teeth and the malposed teeth.

Another object of the invention is to provide means for connecting the delivery member to the anchor teeth and the malposed teeth adapted for use with either of the two types of appliances above described, and a further object is to provide detachably interlocked means adapted for use to connect either an inside or outside arch wire with the anchor teeth and malposed teeth.

Another object of the invention is to provide cooperating sets of separably interlocked devices carried by the arch wire and teeth, respectively, for positively but releasably locking the appliance in place in the mouth to prevent accidental

*Patent No. 1,304,721, United States Patent Office.

displacement of the appliance, or removal of the appliance by the patient, especially by children, said separably interlocked devices being so constructed as to enable the appliance to be readily removed by the dental surgeon.

A further object is to provide interlocking connections between the arch wire and the teeth, so constructed that the arch wire may extend around the arch in the same horizontal plane throughout its length and in planes different distances from the crowns of the teeth.

Another object of the invention is to provide cooperating sets of separably interlocked devices held to the arch wire and teeth, respectively, and so constructed that the devices will not engage the gum when interlocked; and still another object is to provide positively but separably interlocking devices so con-

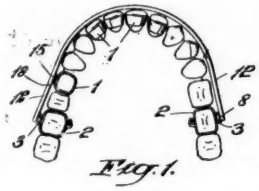


Fig. 1.

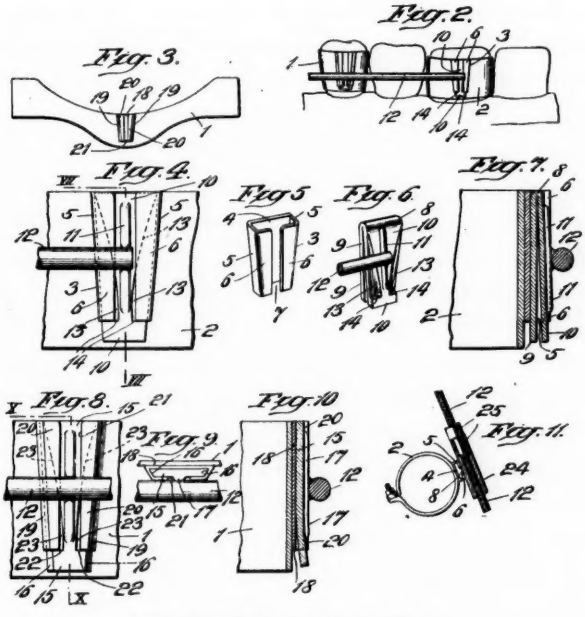


Fig. 2. Fig. 3. Fig. 4. Fig. 5. Fig. 6. Fig. 7. Fig. 8. Fig. 9. Fig. 10. Fig. 11.

1,304,721—Orthodontia Appliance.

structed as to insure firm and rigid connections between the arch wire and the teeth and to prevent relatively lateral movement between the cooperating interlocked devices.

In the drawings, Figure 1 is a plan view of the appliance mounted on the teeth, showing one embodiment of the invention;

Fig. 2 a fragmentary side elevation;

Fig. 3 a detail view of a band adapted to be bent around a malposed tooth and secured thereon by soldering its overlapped ends together, said band having soldered thereon the female member of the interlocking connection by which the arch wire is connected with the band;

Fig. 4 an enlarged side elevation showing the interlocking connection between the end of the arch wire and one of the anchor bands;

Fig. 5 a detail perspective view of the female member of the interlocking connection shown in Fig. 4;

Fig. 6 a detail perspective view of the male member of the connection shown in Fig. 4;

Fig. 7 a vertical sectional view taken on the line VII—VII of Fig. 4;

Fig. 8 a view similar to Fig. 4 showing the interlocking connection between the arch wire and the band on a malposed tooth;

Fig. 9 a plan view of the connection shown in Fig. 8;

Fig. 10 a vertical section taken on the line X—X of Fig. 8; and

Fig. 11 a plan view, partly in horizontal section, showing the manner of anchoring the arch wire when a tube and adjusting nut is employed for altering the length of the wire.

Referring to the various parts by numerals, 1 designates the metal bands fitted about the malposed teeth and 2 designates the usual anchor bands fitted about the molar or anchor teeth. The anchor bands 2 each have soldered or otherwise secured thereto the female member 3 of a separable connection. The female or socket member 3 comprises a back plate 4 soldered to band 2 and bent to form inclined side walls 5 and vertical flanges 6 parallel with and spaced from the back plate. The member 3 thus formed provides a tapering socket, as clearly shown in Figs. 4 and 5, the front wall of which is slotted vertically throughout its length at 7. The male member 8 of the anchoring connection comprises a spring metal plate doubled upon itself to form a back member 9 and a front member 10, tapering from their upper ends to their lower ends and having their free lower ends normally spaced apart, as clearly shown in Figs. 6 and 7. The front portion 10 is provided with a vertically extending central rib 11 and the adjacent end of the arch wire or delivery member 12 is soldered to said rib at any desired point along the rib. The outer face of the front portion 10 of the member 8 is cut away along each side of the rib 11 from a point adjacent the free lower end thereof to a point adjacent its upper end, to form beveled surfaces 13 and shoulders 14. It will be obvious that by pressing the portions 9 and 10 of member 8 together and forcing the same downwardly through member 3, the free ends of said portions will spring apart as soon as shoulders 14 pass the lower ends of flanges 6 until the beveled surfaces 13 engage the inner sides of said flanges, whereupon the shoulders 14 will engage under the lower ends of the flanges and lock members 3 and 8 against separation. During the act of interlocking members 3 and 8, and after said members are interlocked, the rib 11 projects outwardly through the slot 7 and the arch wire 12 lies outside of the member 3.

The arch wire or delivery member 12 comprises a stiff spring wire or bar curved or bowed to approximate the curvature of the dental arch, and has soldered thereto at the proper point or points the male members 15 of coupling devices for connecting the arch wire with the bands 1 fitted about the malposed teeth. The members or posts 15 are formed of resilient metal and are preferably relatively flat in horizontal section, the lower portion of each post being bent out-

wardly, as shown in Fig. 10. The posts 15 gradually decrease in width from their upper to their lower ends, and the side edges thereof are beveled as shown at 16. The posts 15 are formed with vertical central ribs 17 on their outer faces and the arch wire or bar 12 is soldered to said ribs at any suitable or desired point along the length of the ribs. The outer face of each post is cut away along each side of rib 17 to form shoulders 22 and beveled or inclined surfaces 23, the cut-away portions gradually decreasing in depth toward the upper ends of the posts. Downwardly tapered female or socket members 18 are soldered to the bands 1, said members being of substantially the same construction as the socket members 3, and comprising a metallic plate bent to form inclined side walls 19 provided with flanges 20 parallel with and spaced from the rear wall of the member. The downwardly inclined side walls 19 of the socket members 18 are also bent inwardly toward each other, as shown more clearly in Figs. 8 and 9, and the adjacent edges of flanges 20 are spaced apart to provide an opening or vertical slot 21 extending throughout the length of the socket member.

The members 15 and 18 are interlocked by forcing the member 15 downwardly into member 18, the rib 17 on member 18 passing through the slot 21 and the arch wire 12 passing down along the outer sides of flanges 20, as shown in Figs. 8 to 10. During the downward movement of post 15 the outwardly bent lower portion thereof will yield rearwardly and be in alinement with the upper portion of the post, but as soon as shoulders 22 pass below the lower ends of flanges 20 the lower end of the post will spring outwardly to its normal position, whereupon the inclined faces 23 will engage the inner sides of flanges 20 and shoulders 22 will engage under the lower ends of flanges 20, thus positively locking the coupling members 15 and 18 together.

The anchor lock above described may also be employed in an appliance of the type heretofore described in which the arch wire or delivery member is supported at its ends in anchor tubes and is adjusted by means of nuts threaded on the arch wire and engaging the tubes. When so employed, I prefer to solder the back plate 4 of the socket member 3 to the anchor band 2 and solder the anchor tube 24 at the desired point along rib 11 on the front portion 10 of male member 8, as shown in Fig. 11. With this construction it will be observed that the anchor tubes 24, arch wire 12, and adjusting nuts 25 may be removed bodily in assembled relation from the mouth without the necessity of disturbing the adjustment of the nuts 25 on the arch wire.

The tapered formation of the male and socket members of the interlocking connections prevents lateral movement between the members and insures a firm and rigid connection between the arch wire and the teeth. The interlocked members 3 and 8 may be readily separated by pressing the lower end of the front portion of member 8 inwardly by means of a suitable implement and pulling upwardly on the arch wire 12. The members 15 and 18 may be readily separated by pressing the outwardly bent lower end of member 15 inwardly and pulling upwardly on the arch wire.

What I claim is:

1. An orthodontia appliance embodying an anchor band adapted for connection to a tooth, a tapered socket member fixed on the outer side of said band

and having its smaller end terminating intermediate the edges of the band, an arch member, a tapered post member of resilient material fixed to the arch member adapted to engage in said socket member and provided with an abutment adjacent its smaller end adapted to engage under the lower edge of the socket member.

2. An appliance of the class set forth embodying a band adapted to be secured about a tooth, a socket member fixed to the outer surface of the band and provided with a slot or opening from top to bottom thereof, an arch wire, and a member secured to the arch wire and extending at an angle thereto and cut away to form inclined surfaces adapted to engage the inner surface of the socket member at each side of said slot and abutments adapted to engage one end of the socket member at opposite sides of said slot when said members are in engagement with each other.

3. An appliance of the class set forth embodying a band adapted to be secured to a tooth, a socket member fixed to said band and provided with a vertical slot extending from top to bottom thereof, a post member adapted to engage in said socket member and formed with a vertical rib adapted to project through said slot, and an arch member secured to said rib.

4. An appliance of the class set forth comprising a band adapted to be secured about a tooth, a socket member fixed to said band and having its outer wall slotted vertically throughout its length, a post member of resilient material formed with a vertically extending raised portion adapted to project through said slot and inclined surfaces at each side of said raised portions, said post member being also formed with abutments at one end of said inclined surfaces adapted to engage under one end of the socket member at opposite sides of said slot and being bent to cause that portion of the member provided with the abutments to move outwardly automatically when the abutments pass beyond the end of the socket member, and an arch member secured to said rib intermediate the ends of the post member.

5. An appliance of the class set forth comprising a band adapted to be secured about a tooth, a socket member fixed to said band and having its outer wall slotted vertically throughout its length, a post member adapted to engage in said socket member formed of a strip of resilient metal doubled upon itself with its ends normally spaced apart, one portion of the doubled member being formed with a vertically extending raised portion on its outer face adapted to project through said slot and inclined surfaces at opposite sides of the raised portion terminating adjacent the free end of said portion to form abutments adapted to engage one end of the socket member at opposite sides of the slot, and an arch member secured to said raised portion intermediate the ends of the post member.

6. Means for connecting the delivery member of an orthodontia appliance to a tooth band comprising a pair of relatively slidable post-and-socket members tapered longitudinally, one of said members having a yieldable portion carrying an abutment adapted to engage the smaller end of the other member to releasably lock the members together, and one of said members being fixed to the tooth band and the other member being removable with the delivery member.

7. Means for connecting the delivery member of an orthodontia appliance to

a tooth band comprising a tapered socket member fixed on the tooth band slotted at one side throughout its length, a tapered post member having a yieldable portion provided with an abutment adapted to engage the edge of the smaller end of the socket member to detachably lock the post member in the socket member, said post member being formed with a longitudinally extending raised portion adapted to project through the slot in the socket member and with which the delivery member is connected.

8. An orthodontia appliance comprising a tooth-embracing band, a socket member fixed to the outer surface of the band and provided with a slot extending from top to bottom thereof, an arch wire, and a resilient post fixed on the arch wire and extending at an angle thereto, said post having one end normally deflected and cut away on the concave face thereof to form abutments adapted to engage under one end of the socket member at opposite sides of the slot.

9. An orthodontia appliance comprising a tooth band, a coupling member carried by the band and lying within the planes of the edges thereof, a delivery member, and a coupling member carried by the delivery member adapted to be detachably interlocked with the first-mentioned coupling member and to lie between the planes of the edges of the tooth band when so interlocked.

ORTHODONTIA APPLIANCE, PATENTED MAY 27, 1919*

THIS invention relates to improvements in orthodontia appliances or tooth-regulating and retaining appliances of the arch wire type.

The present invention has for one of its objects the provision of efficient means for detachably locking the arch wire or delivery member to the anchor teeth and the malposed teeth.

Another object is to provide detachably interlocked means adapted for use with either an inside or outside arch wire for positively locking the arch wire to the anchor teeth.

Another object of the invention is to provide cooperating sets of separably interlocked devices held to the arch wire and teeth respectively, and so constructed that the devices will not engage the gum when interlocked; and still another object is to provide positively but separably interlocking devices so constructed as to insure firm and rigid connections between the arch wire and the teeth and to prevent relatively lateral movement between the cooperating interlocked devices.

A further important object of the invention is the provision of a separable coupling for connecting an arch wire to tooth bands comprising relatively slidable interlocking members, which coupling may be made and sold independently of the arch wire and bands and the members of which may be readily affixed or soldered to the arch wire and bands at the desired points by the dental surgeon.

In the drawings, Figure 1 is a plan view of one embodiment of the invention and showing the arch wire or delivery member and the anchoring means;

Fig. 2 an enlarged vertical sectional view taken on the line 2—2 of Fig. 1;

*Patent No. 1,304,722, United States Patent Office.

Fig. 3 a detail side elevation showing the anchoring means at one end of the arch wire;

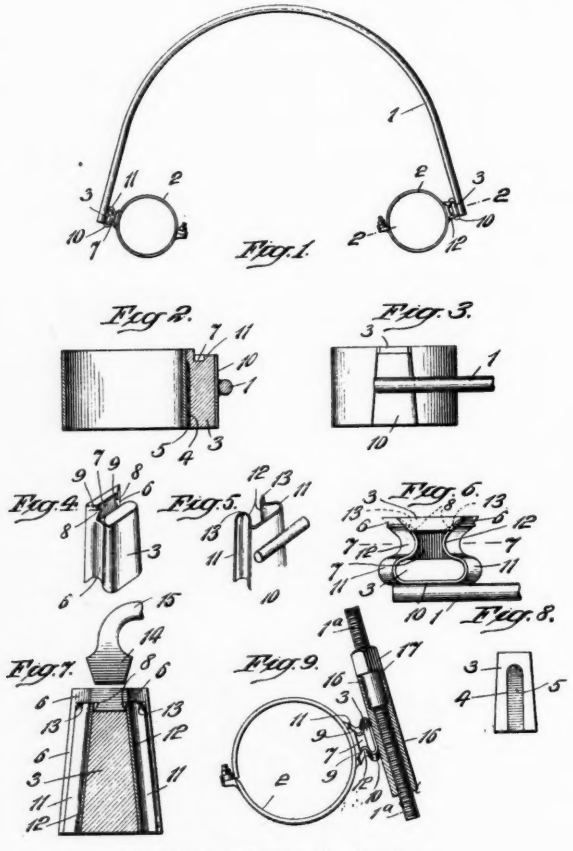
Figs. 4 and 5 detail perspective views of the male and female members of the separable coupling, respectively;

Fig. 6 an enlarged plan view of the coupling members in interlocked relation;

Fig. 7 a vertical sectional view taken on the line 7—7 of Fig. 6;

Fig. 8 a rear elevation of the male coupling member; and

Fig. 9 a detail plan view showing the separable coupling applied to an appliance of the type shown in patent to Angle, No. 626,476.



1,304,722—Orthodontia Appliance.

Referring to the various parts by numerals, 1 designates the delivery member or arch bar which may be of any usual or suitable construction, preferably being formed of a piece of stiff resilient wire bent to conform to the curvature of the dental arch, and 2 designates the usual anchor bands adapted to be fitted about the anchor teeth or molars in the well-known manner.

The separable locking connections between the arch wire and the two anchor bands 2 are of the same construction. Each of said connections embodies a post coupling member, block or post 3 the rear face of which is soldered to the outer surface of the anchor band 2.

I prefer to form a recess or cavity 4 in the rear face of the post 3 which may be filled with solder 5, either by the dental surgeon or the manufacturer. By filling the cavity with solder flush with the rear face of the post the post may be readily secured to the anchor band by simply heating the solder and placing the rear face of the post against the band. This method of soldering the post to the band avoids waste of solder and also avoids running of surplus solder beyond the sides of the post where it would interfere with the engagement of the socket member of the coupling with the post. The sides of post 3 taper from one end to the other of the post and are provided with longitudinal grooves 6. The smaller end of the post is formed with a transverse slot 7 extending from one groove 6 to the other groove, and that portion of the sides of the post between the rear wall of the slot and the rear face of the post is provided with oppositely disposed notches 8 forming shoulders or abutments 9 adjacent the smaller end of the post.

The socket member 10 is formed of a piece of resilient sheet metal bent to form a tapered plate provided with inclined side flanges 11 pressed inwardly longitudinally thereof to form ribs 12 adapted to slide in the grooves 6 in the sides of the post or block 3. The outer corners of the flanges at the smaller end of member 10 are bent laterally to form projections 13 adapted to snap in the notches 8 under shoulders 9 on post 3 when the member 10 is moved downwardly about the post. The post 3 is preferably of the same length as the width of the anchor band, and the member 10 is preferably shorter than the post 3 so that the ends of the post and member 10 will not extend beyond the edges of the band when the post and member are in interlocked relation.

When the two relatively slidable members of the separable connection are interlocked as shown in Figs. 1 to 3, and Figs. 6 and 7, accidental separation of the members is impossible owing to the engagement of the laterally bent corners 13 of the flanges 12 of the socket member in the notches 8 in the post or block 3. This positive lock also serves to prevent the patient, and particularly children, from tampering with the appliance and partially or entirely disconnecting the delivery member from the teeth. The delivery member may be readily detached by the dental surgeon by means of a suitable implement, such as that shown in Fig. 7, having a wedge-shaped head 14 and a suitable handle 15, or by means of a small pair of pliers having relatively sharp or thin jaws. It will be obvious that by forcing the wedge-shaped head 14 of the implement 15 downward in the slot 7 in the smaller end of post or block 3, the adjacent ends of flanges 12 on the socket members, which extend above the bottom of said slot, will be forced outwardly away from each other, thus releasing the projections 13 on the flanges from the notches 8, whereupon the members 3 and 10 may be readily separated by giving them a relative longitudinal sliding movement. To release the socket member by means of a pair of pliers, the points of the jaws of the pliers are inserted in the slot 7 and the jaws are then spread apart to force flanges 12 away from each other.

The separable coupling above described is also adapted for use with an appliance of the type shown in the patent to Angle, No. 626,476, above referred to.

When so employed, the post or block 3 is preferably soldered to the anchor band 2 in the manner above described, and the socket member 10 is soldered at any desired point intermediate its ends to the usual anchor tube 16 employed in this type of appliance, as shown in Fig. 9. The arch wire or delivery member 1^a is threaded at its ends in the usual manner, and adjusting nuts 17 are threaded on the ends of the wire 1^a and cooperate with tubes 16 in the usual manner. In the construction shown in Fig. 9 it will be observed that the anchor tubes 16, adjusting nuts 17, and the arch wire or delivery member 1^a may be removed bodily in assembled relation from the mouth without disturbing the adjustment of the nuts 17 on the arch wire 1^a.

The tapered formation of the two interlocking members 3 and 10 insures an accurate fit of the member 10 about member 3, thus preventing relative lateral movement of the interlocked members and affording a firm and rigid connection between the arch wire and the anchor tooth. It will be observed also that the separable coupling may be employed, if desired, to connect the arch wire with bands fitted on the malposed teeth.

What I claim is:

1. An orthodontia appliance comprising a curved delivery member, bands adapted to be secured to teeth, and two-part separable couplings for holding the delivery member to the bands, one part of each coupling being connected with a band and the other with the delivery member and each of said couplings embodying a post having undercut sides and a plate having side flanges bent inwardly toward each other to slidably engage the under-cut sides of said post.

2. An orthodontia appliance comprising a curved delivery member, bands adapted to be secured to teeth, and two-part separable couplings for holding the delivery member to the bands, one part of each coupling being connected with a band and the other with the delivery member and each of said couplings embodying a post having undercut sides and a plate having side flanges bent inwardly toward each other to slidably engage the under-cut sides of said post, said post being formed with a shoulder adjacent one end thereof and one of the flanges on said plate being formed with a laterally projecting portion adapted to engage said shoulder to lock the post and plate against relative longitudinal movement.

3. An orthodontia appliance comprising a delivery member, tooth-embracing bands, and two-part separable couplings for detachably connecting the delivery member with said bands one part of each coupling being fixed to a band and the other being connected with the delivery member, each coupling embodying a tapered post having under-cut sides and recesses at opposite sides of the post adjacent the smaller end thereof, and a tapered socket part having one open face and inwardly pressed sides adapted to slidably embrace the post, the sides of said socket being each formed with a lateral projection adjacent the smaller end of said part adapted to engage in one of the recesses in the post to lock the parts together.

4. An orthodontia appliance comprising an arch wire, tooth bands, and two-part separable couplings for detachably locking the wire to the bands, one

part of each coupling being fixed to a band and the other to the arch wire, each coupling embodying a tapered post having its sides formed with longitudinal grooves and provided with a transverse slot at its smaller end extending between said grooves and shoulders at the ends of said slot, and a tapered socket comprising a plate having yieldable side flanges pressed inwardly longitudinally to form ribs adapted to slide in the grooves on the post, each of said flanges being provided with a lateral projection adjacent the smaller end of the socket adapted to engage one of the shoulders on the post to lock the parts together.

5. An orthodontia appliance comprising anchor bands adapted to embrace posterior teeth of the dental arch, a tapered block having its inner face soldered to each band, said block being formed with longitudinal channels in the sides thereof connected at the smaller end of the block by a transverse slot and the sides of said block being provided with recesses above the bottom of said slot, an arch wire, tapered plates soldered to the arch wire adjacent the ends of said wire and formed with side flanges bent inwardly toward each other to engage in the channels in said block, the flanges on said plates being formed with projections adapted to engage in the recesses in the block to lock the plate and block against relative longitudinal movement.

6. The combination with a tooth-embracing band and the arch wire of an orthodontia appliance, of a two-part separable locking device embodying a block having a cavity in its inner face containing solder for attaching the block to the band, and a substantially **U**-shaped member soldered to the arch wire slidably embracing the block to move longitudinally thereof, said member and block being formed with cooperating longitudinally extending interlocking portions for holding the block and member against relative lateral movement.

7. The combination with a tooth-embracing band and the arch wire of an orthodontia appliance, of a two-part separable coupling embodying block fixed on the band and a substantially **U**-shaped member the transverse wall of which is fixed to the arch wire intermediate its ends, the sides of said member having a slidable interlocking connection with the sides of the block to prevent lateral movement of the member and permit connection and disconnection of the members by a relative longitudinal movement.

8. An anchor coupling for orthodontia appliances embodying a block having one face provided with a cavity, solder filling said cavity to adapt the block to be soldered to a tooth-embracing band, and a plate adapted to be connected with an arch wire and provided with side flanges adapted to embrace the sides of said block and having a longitudinally extending tongue-and-groove connection therewith.

9. Means for separably connecting an arch wire to a tooth, embodying a tooth-embracing band, and a two-part coupling, one part of which is fixed on the band and the other part of which is connected with the arch wire, said coupling parts having a tongue-and-groove connection to permit connection and disconnection thereof by a relative longitudinal movement and to prevent relative lateral movement of the parts when connected together.

10. Means for separably connecting an arch wire to a tooth, embodying a tooth-embracing band, and a two-part coupling, one part of which is fixed on the band and the other part of which is connected with the arch wire, said coupling parts having a tongue-and-groove connection to permit connection and disconnection thereof by a relative longitudinal movement and to prevent relative lateral movement of the parts when connected together, and one of said parts being formed with a recess and the other with a yieldable portion carrying a projection adapted to engage in said recess to releasably lock the parts together.

11. An orthodontia appliance comprising a delivery member, a socket coupling member supported by the delivery member and formed with a longitudinally extending channel having inwardly flaring side walls, a tooth-embracing band, and a post coupling member having one face secured to the band and formed with under-cut sides.

12. An orthodontia appliance comprising a delivery member, a socket coupling member having one face soldered to the delivery member at a point intermediate the ends of the coupling member, said coupling member being formed with a longitudinal channel having inwardly flaring side walls, a tooth-embracing band, and a post coupling member soldered to said band and formed with a relatively narrow portion adapted to extend through the throat of the channel in the socket member and an enlarged portion adapted to engage in said channel.

13. An anchor coupling for orthodontia appliances, embodying a block or post forming a coupling member and having one face provided with a cavity, solder filling said cavity to adapt the block to be soldered to a tooth-embracing band, and a plate or socket member adapted to be connected with an arch wire and provided with side flanges adapted to embrace the sides of said block.

14. Means for connecting the arch wire of an orthodontia appliance to a tooth band, comprising a pair of relatively slidable post and socket members tapered longitudinally, one of said members at its smaller end being formed with a transverse abutment, the other one of said members having a yieldable portion at its smaller end adapted to engage the abutment of the other member to releasably lock the members together, one of said members being fixed to the tooth band, and the other member being fixed to the arch wire.

15. Means for connecting the arch wire of an orthodontia appliance to a tooth band, comprising a pair of relatively slidable post and socket members tapered longitudinally, one of said members at its smaller end being formed with a transverse abutment, the other one of said members having a yieldable portion at its smaller end adapted to engage the abutment of the other member to releasably lock the members together, one of said members being fixed to the tooth band and the other member being fixed to the arch wire, the post and socket members being noncircular in cross section to hold the post against relative, rotative movement.

ORTHODONTIA APPLIANCE. PATENTED MAY 27, 1919*

THIS invention relates to improvements in orthodontia appliances or tooth-regulating and retaining appliances of the arch wire type.

The present invention has for one of its objects the provision of efficient means for detachably locking the arch wire or delivery member to the anchor teeth and the malposed teeth.

A further object of the invention is to provide separably interlocked sets of devices for connecting the arch wire with the anchor teeth or malposed teeth, or both, as desired, said devices being so constructed as to permit the arch wire to extend about the dental arch in the same horizontal plane, if desired, and so that the arch wire may be held to one set of devices to extend transversely thereof in horizontal planes at various distances from the plane of the gum.

Another object of the invention is the provision of separably interlocking devices supported by the arch wire and teeth, respectively, so constructed that the devices will not engage the gum when interlocked.

Another object is the provision of positively but separably interlocking sets of devices for connecting the delivery member with the teeth, so constructed as to insure firm and rigid connections between the delivery member and the teeth.

In the drawings, Fig. 1 is a plan view of one embodiment of the invention showing the arch wire and the means for connecting the arch wire to the anchor teeth;

Fig. 2 an enlarged, vertical, sectional view taken on the line 2—2 of Fig. 1;

Fig. 3 an enlarged side elevation showing the anchoring means at one end of the delivery member;

Figs. 4 and 5 detail perspective views of the two members of one of the separable coupling devices;

Fig. 6 a rear elevation of the coupling member shown in Fig. 5;

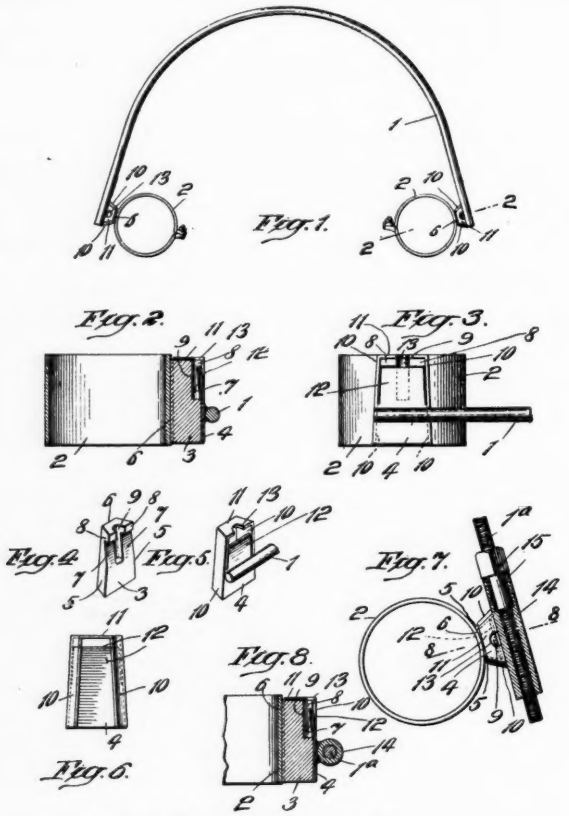
Fig. 7 a fragmentary plan view; partly in horizontal section, showing the coupling embodied in an appliance of the type shown in the patent to Angle, No. 626,476; and

Fig. 8 a vertical sectional view taken on the line 8—8 of Fig. 7.

Referring to the various parts by numerals, 1 designates the curved delivery member, which may be of the usual or any suitable construction, preferably being formed of a piece of relatively stiff resilient wire bent to conform approximately to the curvature of the dental arch, and 2 designates the usual anchor bands adapted to be fitted about the anchor teeth or molars. The separable connections between the anchor bands 2 and the delivery member are of the same construction, and comprise relatively slidable members 3 and 4. The member 3 is in the form of a post or block having tapering side edges 5, which edges are beveled so as to extend inwardly toward each other from the outer face of the block 3 to the inner face 6 of the block. The relatively nar-

*Patent No. 1,304,723, United States Patent Office.

row inner face of the block is soldered to the outer side of the anchor band, and the block 3 is preferably of such length that the ends thereof do not extend beyond the edges of the band 2. The relatively wide outer face of the block or post 3 is notched or cut away to form a depression. The notch in the post is preferably formed, as shown more clearly in Fig. 4, to provide an inclined surface 7 and shoulders or abutments 8, adjacent the smaller end of the tapered block or post 3. The relatively wide outer face of the post 3 is also provided with a vertical groove or channel 9. The socket member 4 is formed of sheet metal, and comprises a tapered plate formed with side flanges 10 bent inwardly toward each other to conform to the beveled and inclined side edges



1,304,723—Orthodontia Appliance.

5 of the block 3, and with a transverse bar 11 connecting the ends of said flanges together at the smaller end of the tapered socket member. The relatively narrow or rear face of the socket member 4 is open throughout its length, and the relatively wide front plate of the socket member is stamped or cut to form a resilient tongue 12, normally deflected rearwardly toward the narrow open rear side of the socket member 4. The transverse bar 11 connecting the side flanges 10 of the socket member 4 is cut away at its outer or wider edge to form a notch 13, adapted to register with the groove or channel 9 in the post or block 3, when the members 3 and 4 are in engagement with each other. The delivery member or arch wire 1 may be soldered to the wide outer wall of

the socket member 4 at any point intermediate the base of the tongue 12, and the wider end of the socket member.

It will be obvious that when the socket member 4 is slid downwardly about the post or block 3, that the free end of the resilient tongue 12 will snap under the shoulders 8 on the post 3, and thus positively lock the members 3 and 4 together. To disconnect the members 3 and 4, it is simply necessary to insert an instrument having a fine or needle point, downwardly through the notch 13 in the transverse bar 11 of the socket member into the groove or channel 9 in the post 3, and force the point of the implement laterally to press the resilient tongue 12 outwardly from beneath the shoulders 8, whereupon the member 4 may be moved relatively to the member 3, by pressure on the arch wire 1.

The separable connection above described is also adapted for use with an appliance of the type shown in the patent to Angle, No. 626,476, above referred to. When so employed, the post or block 3 is soldered or otherwise fixed to the anchor band 2, as above described, and the socket member 4 is soldered or otherwise fixed to the usual anchor tube 14, employed in this type of appliance. The arch wire 1^a extends through the anchor tube 14, and has threaded thereon the usual adjusting nut 15. In the construction just described, it will be observed that the delivery member or arch wire $1,^a$ the adjusting nuts 15, and anchor tubes 14, may be removed from the mouth bodily in assembled relation, without disturbing the adjustment of the nuts 15.

The tapered formation of the members 3 and 4 insures an accurate fit of the members 3 within the members 4, and the beveling of the side edges 5 of the post 3 prevents outward movement of the members 4 relatively to the post 3. It will thus be observed that a firm and rigid connection is provided between the delivery member and the anchor band, and that relative movement of the interlocked members of the separable connection is impossible, while the members are in interlocked relation. It will also be observed that accidental disconnection of the delivery member from the teeth is impossible, and that the delivery member cannot be disconnected by the patient, but may be readily removed by the dental surgeon, by means of a suitable implement. It will also be obvious that the separable coupling members 3 and 4 may be employed to connect the delivery member 1 to bands fitted about malposed teeth, as well as to bands fitted about the anchor teeth or molars, and that the delivery member 1 may be soldered or otherwise fixed to the socket member 4 at any desired point intermediate the wider end of the socket member and the base of the tongue 12.

What I claim is:

1. Anchoring means for the delivery member of an orthodontia appliance comprising an anchor band adapted to be fixed to an anchor tooth, a block fixed to said band having outwardly flaring side edges and provided with an abutment on its outer face, a member supported by the delivery member adapted to slide longitudinally of said block having a channel formed with side walls inclined toward each other, and yieldable means carried by said channel member adapted to engage the abutment on the block.

2. Anchoring means for the arched bar of an orthodontia appliance comprising an anchor band, a block affixed to said band having outwardly flaring side edges and provided with an abutment on its outer face, a member connected with the arch wire slidable longitudinally on said block and having a channel formed with side walls inclined toward each other to embrace the flaring side edges of the block, and a resilient tongue carried by said member adapted to engage said abutment on the block.

3. In an orthodontia appliance, the combination with a tooth band and an arched delivery member, of a separable coupling for connecting the delivery member to the band embodying a block having flaring side edges, and a notch or recess in one face thereof, and a socket member having a channel formed to receive the block and having a yieldable portion adapted to engage in a notch or recess in said block to releasably lock the block and the socket member together.

4. Means for detachably locking the arch bar of an orthodontia appliance to a tooth band, embodying two relatively longitudinally slidable members held to the band and arch bar respectively, one of which is provided with flaring side edges and a recess in one face thereof, and the other of which is formed with a channel to receive the other member and a resilient portion at the bottom of said channel adapted to engage in said recess to lock the members in engagement with each other.

5. An orthodontia appliance comprising an arched or curved delivery member, a socket member carried by said delivery member having one open end and an open face and side walls inclined inwardly toward each other, the other face of said socket member being provided with a spring tongue normally deflected toward the open face of the socket member, a band adapted to be secured about a tooth, a block fixed to said band and having outwardly flaring side edges and a notch or recess in its outer face adapted to receive the free end of the spring tongue when said block is engaged in the socket member.

6. An orthodontia appliance comprising a band adapted to be secured to a tooth, a tapered block fixed to said band and having outwardly flaring side edges and a depression in its outer face adjacent the smaller end of the block, a delivery member, a tapered socket member supported on the delivery member and having side walls inclined inwardly toward each other to embrace the tapered and flaring edges of the block, and a spring tongue carried by the socket member adapted to engage in the depression in the block to releasably lock the block and socket member together.

7. An orthodontia appliance comprising a band adapted to be secured to a tooth, a block fixed to said band and having beveled side edges and a transverse notch in its outer face intersected by a longitudinal channel, a metal plate having side flanges bent inwardly toward each other to embrace the beveled edges of the block and a yieldable tongue stamped therefrom adapted to snap in the transverse notch in said block when the plate is slid longitudinally on the block, and a delivery member connected with said plate.

8. An orthodontia appliance comprising a band adapted to be secured to

a tooth, a block fixed to said band and having tapered and beveled side edges and a transverse notch in its outer face, a tapered metal plate slidable longitudinally of said block having inclined side flanges bent inwardly to embrace the tapered and beveled side edges of the block and formed with a resilient tongue normally deflected inwardly between said flanges and adapted to snap in said notch in the block, and a delivery member connected with said plate.

9. In an orthodontia appliance the combination with a tooth band and an arch wire, of a separable coupling for connecting the arch wire to the band embodying a block formed with a notch or recess in one face thereof, and a socket member having a channel formed to receive the block and provided with a resilient tongue adapted to engage in the notch or recess in said block to releasably lock the block and the socket member together, one of said coupling members being connected to the tooth band and the other being connected to the arch wire.

ABSTRACT OF CURRENT LITERATURE

Covering Such Subjects as

ORTHODONTIA — ORAL SURGERY — SURGICAL ORTHODONTIA — DENTAL RADIOGRAPHY

It is the purpose of this JOURNAL to review so far as possible the most important literature as it appears in English and Foreign periodicals and to present it in abstract form. Authors are requested to send abstracts or reprints of their papers to the publishers.

Surgical Treatment of Prognathism. L. Dufourmontel (Paris) La Presse Médicale. March 23, 1921, xxix, 24.

The author does not refer to true prognathism but to an acquired condition, a thrusting forward of the mandible in an old unreduced and irreducible dislocation. In cases of this sort bilateral resection of the two condyles is the usual treatment. The author has operated in this manner a number of times. The intervention is not so serious as at first sight appears although the condyle may be ankylosed. The technic is in part as follows: both sides are operated on jointly and incisions are made just above the condyles and the latter with their necks are exposed by means of retractors. This is somewhat tedious on account of the density of the fibrous structures but no dissection is allowable, as there are several important structures which must not be divided—vessels, nerves and parotid gland. The neck of the condyle is now divided by a Gigli saw or gouging forceps, the latter being preferable. The neck of the condyle thus divided, the latter is extirpated without much further trouble. If adhesions exist they rupture when the condyle is forcibly extracted by forceps. When the jaw is placed in its original position the teeth do not meet naturally, for on account of the new position of the ascending ramus the upper incisors project beyond the lower. This requires prosthesis, although it is not unlikely that if left alone this condition would in time rectify itself. But the gaping between the upper and lower arches is a reproach to the operator who takes steps to correct it by prosthesis. In the absence of illustrations the latter cannot be accurately described in a few words but the articulating surfaces of the teeth are first covered by a metal or vulcanite sheath provided with lateral hooks and by means of rubber traction the two jaws are gradually brought together, about 4 weeks being required. The subject is allowed to eat and exercise his new articulation.

Painless Extraction. P. F. Eckstein (Berlin). Zahntechnische Reform. March 13, 1921, xxv, 11.

The author's method of painless extraction has been discussed by two colleagues, Hahn and Kolmar, with special reference to the incision which

precedes extraction. It is understood that incision merely to test the action of the anesthetic is not justifiable. In regard to incision practiced for access, Hahn advocates as preferable detachment of the gum with subsequent forcing back, a method known to the ancient Roman dentist. The practice was in vogue in the XVII century when the dentist of the period invariably loosened and pushed back the gum with a spatula before extraction. It is true that for successful extraction the tooth should be grasped deeply and when the forceps is forced strongly into the intact gum the latter is made the seat of a contused wound, which in turn may readily end in necrosis, while in general the crushing type of wound is attacked readily by bacteria in general, so that a focus of infection may originate. The author therefore prefers a clean incised wound of the gum parallel with the root of the tooth. Since there will in any case be an extraction wound, this incision is only a continuation of it. Incision is by no means always necessary and in certain cases the root can be grasped deeply without resort to it. Naturally it is indispensable if resection of the alveolus is necessary. Many modern dentists advocate routine incision before extraction. While Hahn uses the gum separation method Kolmer appears to practice his own incision technic which the author does not repeat, save that it is made but one minute after the anesthetic injection, while he himself always waits 5 to 8 minutes. He does not believe that anesthesia of the gum is the cue to extract the tooth.

Benign Septicemia From Filling the Root of a Molar Tooth. J. Bercher (Val-de-Grace). La Revue de stomatologie, March, 1921, xxiii, 3.

The author, who is stomatologist to the military hospital at Val-de-Grace, relates the case of a surgeon-major whose 12 year left lower molar was the seat of an ordinary pulpal necrosis with arthritis and fistula. The x-ray showed that the latter proceeded from the distal root, and that there was no other osseous lesion. When the tooth was opened the canals were found to be badly infected. While they were improved under treatment, the officer was obliged to attend to another matter and there was a long interruption during which the tooth remained open. Root treatment was eventually resumed and in the course of two months the roots were believed to be ready for filling. The formula known as "rose paste" was used but there followed a violent reaction overnight, so that the filling was at once removed with great relief. After further root treatment a simple zinc oxide filling was inserted. There was no local reaction this time, but a severe constitutional disturbance with vomiting and an outbreak of hives, fever and suppression of urine. There was no sign of any local disturbance, and in 24 hours the constitutional reaction had subsided. As the officer was then about to sail on a long voyage the tooth was extracted as a precautionary measure. The phenomenon suggested that an anaphylaxis had occurred but there was no way by which this hypothesis could be visualized. There was no protein substance in the filling material. An intoxication from the formol used in treating the cavity could be excluded. The only remaining explanation is that of a mild septicemia of a type which has recently been much discussed. There

should from this viewpoint have been a focus of pus somewhere in the body which would naturally have been in the not yet disinfected root canals. These explosions, as in the present case, may not last over 24 hours.

Fractures Into Cavities. Weidner. Deutsche Zahnaerztliche Zeitung. March, 1921, xx, 13.

Fractures of the walls of cavities are not uncommon even with the most correct filling technic. They occur by choice in molars and bicuspids. The usual resource after such an opening results, is to drill and close the breach with amalgam or in rare instances to apply a hollow metal crown. The cause of the accident varies. Naturally it occurs by preference in the walls of large cavities. Secondary caries of the wall of the cavity may or may not be a contributory factor. A tooth with living pulp is less predisposed than one with filled roots. The accident is less common when cement fillings are used and it is the custom of some dentists to line large cavities with cement before inserting amalgam. Some of the conditions of cavity-fractures are dependent in a high degree on technical details which interest only the practitioner in filling. Generally these accidents may be prevented by the use of three resources of which the first refers purely to proper formation of the cavities with strict regard to the histology of the teeth and to the thickness of wall requisite for withstanding the pressure of mastication. The second prerequisite has to do with the fullest possible use of zinc-oxide-phosphate cement, as in lining large cavities before inserting metal fillings. The third resource for the special case is, of course, the use of the hollow metal crown.

The Alterations Which Follow Orthodontic Procedures. A Oser. Zahntechnische Reform, April 24, 1921, xxv, 17.

In artificial regulation of the teeth the alveolar process of the jaw is the part most affected next to the teeth themselves, because it consists of two bony plates which closely invest the teeth on both sides. Above, the buccolabial plate is thinner than the palatine, while in the mandible conditions are parallel save that beyond the second molar they are reversed, the lingual plate being the thinner. The bone mass about the anterior teeth is less than that about the posterior and hence the former are more easily regulated. Hence if the front teeth are crowded one should not extract a molar but a bicuspid. Let us take the case of an upper canine which is forced daily by a turn of the regulating screw a quarter of a millimeter from its palatine position in a labial direction. The first action of the screw on the root of the canine is a traumatic one. The spongy bone which invests the root on the labial side is slightly crushed; while laterally and palatewards there is a laceration or fracture of some of the osseous trabeculæ. A slight effusion of blood into the spongy bone results. For about an hour after turning the screw the patient feels sharp pain. Absorption begins in the spongy bone through the action of the osteoclasts. The trabeculæ undergo a partial change into cartilage. Even the bone plates of the alveolar process share in this action. But as certain areas of bone are absorbed new bone is formed from the osteoblastic layer of

the periosteum. At first known as osteoid tissue it becomes true bone through lime deposit. The cycle ends in absorption of this new bone. With each turn of the screw this process is repeated, but the traumatic action becomes progressively less. When the tooth is in its proper place permanent new bone is formed.

Surgical Treatment of Pyorrhea. A. M. Nodine (New York). The Dental Cosmos, April, 1921, lxiii, 4.

Pyorrhea appears to have increased notably in the English-speaking countries as a result of the war, presumably from the operation of several factors, such as forced neglect of dental hygiene, the use of preserved foods deficient in vitamine content, and probably local factors such as increased use of tobacco, poor prosthetic work, etc., as a result of which there was an abnormal degree of buccal irritation. For practical purposes pyorrhea is a disease characterized by infection between the peridental membrane, the gum and the supporting bone, in which pockets are formed at the expense of the bone and peridental membrane. The pockets in turn contain a mixture of microörganisms, pus and food detritus, which to the naked eye appears as pus alone. There is no surgical treatment before the pockets form, nor after, so much bone has been destroyed that the teeth have to be extracted. Of the three surgical methods commonly in use the author prefers the operation known as Pickerell's with a special technic of his own. This operation may be termed gingivectomy, and the author believes that it will accomplish all that is claimed for the Zentler flap operation. The diseased gum is cut away and all rough bone is trimmed. The operative field is then painted with iodine, packed with iodoform gauze and allowed to heal, this step requiring about a week. The rationale of the intervention is of course to remove every bit of infected tissue, soft or hard, so that healing will mean that healthy gum tissue contracts about the necks of the teeth. During healing the spaces between the teeth must be kept clean. The exposed tooth surface is sensitive of course but this wears off. The gum should shrink after the operation; if not, this means that infectious tissue remains behind. Massage and brushing the gum is an essential part of the aftertreatment.

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EDITORIALS

Orthodontic Patents

FOR several years the dental profession has been divided into two classes. Those who believe in patents which limit the manufacturer and use of dental instruments and processes and those who are opposed to such patents.

The medical profession has long ago gone on record as being opposed to any member of the profession obtaining a patent on any instrument which is used for the treatment of deformities or the alleviation of human suffering.

The dental profession as a whole has never accepted that high standard, probably because dental manufacturers have greatly influenced the ideals of the dental profession.

Several years ago it was our privilege to examine a number of patents covering orthodontic appliances, and we were amazed to find that certain patents had been granted which would practically control the practice of orthodontia if they were ever enforced. Fortunately a large number of these pat-

ents, if brought into the courts, would be declared null and void, because they had been granted to cover some instrument or process which had been in universal use for a considerable time before the patent was granted.

We believe that the dental profession should take a stand in regard to patents equally as high as the medical profession, and consider any man who will patent an instrument, or appliance to be used in the treatment of human suffering or deformities as unethical, and not entitled to membership in the National Dental Association. No physician or surgeon who holds a patent on instruments can be a member of the American Medical Association, and dentistry should have as high a standard from a humanitarian standpoint.

There is no doubt but that a patent on an instrument or device restricts its use in the treatment of human suffering because it necessarily must be sold at a higher price.

Recently our attention has been called to the issuing of a considerable number of patents which cover orthodontic appliances. Some of said appliances having been in use for a considerable length of time in a very similar form. It is also unfortunate that the majority of these patents have been granted to men who occupy high positions in the orthodontic world, and whose conduct, if governed by the medical standards, would prevent them from filling the positions they now occupy. They should not attempt to control the use of any appliance which is used in the treatment of human deformity.

Fortunately for the science of orthodontia, most of these patented devices are not absolutely necessary in correction of deformities. Their use can be avoided; we have other appliances which perform the same purpose that have not been patented.

The extent to which the patent monopoly is attempting to control orthodontic appliances cannot fail to interest the profession. We shall, in the future, publish several orthodontic patents, of which we have obtained copies. Some of these patents deal with instruments that possess virtues, others are of a questionable nature. Nevertheless, the purpose of the patent is manifest in nearly every case.

In this issue, we are publishing in full four patents which, according to the Patent Office, are known as Patents Nos. 1,304,720—1,304,721—1,304,722—and 1,304,723. The first, No. 1,304,720, is a patent covering dental pliers. This special design of pliers is for the purpose of holding band material, and they are, more strictly speaking, orthodontic pliers rather than dental pliers. The inventor evidently had a good and sufficient reason for using the term dental plier in preference to orthodontic plier.

In No. 1,304,721, we find it is granted to the inventor to cover an orthodontia appliance. This patent granted in 1919 shows several interesting features as regards orthodontic terminology. For instance, for "Orthodontia appliance," there should have been used "Orthodontic appliance," which term was adopted by the American Society of Orthodontists, but was not universally accepted in 1919. We also notice the use of some terms which are to a certain extent superior to words as used by orthodontists; we refer especially to the word "arch." Attention has been called to the fact that "arch" is a term greatly overused. We

speak of "expansion arch" and the "dental arch" meaning two different things. One is a mechanical device and the other is an anatomic structure. In the specifications of letters patent, things must be so described so as to be understandable by the Patent Commissioner. Therefore we find this statement "Appliances of this type comprising a curved arch wire or delivery member of approximately the same form as the dental arch. . . ." We see there the use of "delivery member" as a means of describing the appliance instead of the term "arch," because "dental arch" is also employed in the same sentence. It is also stated that "said inseparable interlocking devices being so constructed so as to enable the appliance to be readily removed by the dental surgeon." We wonder why the term "dental surgeon" has been used instead of orthodontist. Again possibly for the purpose of description, and then maybe because this appliance was not supposed to be used by orthodontists but by dental surgeons!

The cuts illustrating this appliance show clamp bands which are referred to as the "usual anchor bands." We are at a loss to know how clamp bands of such a type could be constructed by using the pliers shown in Patent No. 1,304,720. We also have been informed that the inventor has used only plain molar bands for years prior to 1919. Then why clamp bands? As regards the originality of this device we call the attention of our readers to a similar locking device which was used by Doctor Fernald and published over six years ago in the first volume of the *International Journal of Orthodontia and Oral Surgery*. The plan of having a flange to lock the two parts together was also used by Doctor Fernald. There is practically nothing new and original to this device which had not been shown five years before the patent was granted.

The next patent, No. 1,304,722, is a locking device. This patent contains a statement as to the object of the invention which is more or less enlightening.

In none of the patents which we have reviewed, do we find that the inventor makes the plea that he is desirous of advancing the science of orthodontia and rendering a service to humanity.

Under the heading of objects, we find this quotation ". . . which couplings may be made and sold independently of the arch wire. . . ."

In obtaining these patents, we have often wondered whether inventors have not been influenced more by the possibility of the sale of the appliance than by the advancement of the science of orthodontia. The locking device in this patent is practically a reversal of parts as shown in the previous patent.

Patent No. 1,304,723 is also a device for locking lingual or labial wires to the teeth, and while ingeniously constructed, has no practical advantage over a large number of other locking devices, which are in use.

In fact we more or less question the practicability of all of these locking devices, and whether they will be placed on the market is a question that remains to be answered.

It is our intention to review from time to time the various patents that are granted, covering the fields of orthodontia, oral surgery and radiography, and believe that such a review will be of interest, at least, to a few of our readers.

The American Society of Dental Radiographers

SEVERAL attempts have been made at various times to perfect a Society of Dental Radiographers which would be representative of the men engaged in the practice of that specialty. Most of these efforts have been more or less the work of a single individual, and the results have not been conducive of the greatest good as regards a National organization. In order to overcome this objection an organization was perfected in Milwaukee, composed of men from different parts of the country extending from the Atlantic to Pacific Coast, and from the North to the South.

The organization was composed of men who had attained prominence as dental radiographers. The purpose of this organization is to work for the advancement of Dental Radiography as a science, to study ways and means of improving technic so the science can be standardized. Also to use means for promoting dental radiography as a specialty of dentistry, and to make the dental profession realize that radiography is a profession and not a commercial art that can be practiced by any one who has a knowledge of electricity and photography.

We believe that by united effort of the dental radiographers, this specialty of dentistry and medicine can be brought to a much higher position than it now occupies because many men of the profession do not realize the true significance of radiography.

Band Materials

IN THIS issue of the INTERNATIONAL JOURNAL OF ORTHODONTIA AND ORAL SURGERY will be found an article by Dr. Herbert A. Pullen dealing with band materials and band technic. This article is a plea and an attempt by Doctor Pullen to standardize band materials and technic. Any effort to standardize any technic is a commendable act. However, some of the things advocated by Doctor Pullen are so at variance with the practices and beliefs of other men that we cannot allow this article to remain as giving forth ideas as held by all of the men practicing orthodontics.

The first plea which Doctor Pullen makes for the standardization of band materials is the use of gold and platinum. This band material in our hands has proved entirely unsatisfactory, both in private practice and clinical work. We have tried every alloy of gold and platinum that has been placed on the market, and it may be possible that Doctor Pullen has a special alloy of this material that we have not tried, but unless such is the case, we unreservedly condemn the use of gold and platinum as the ideal band material. In our experience it has absolutely nothing to recommend it over other materials. So far as strength is concerned, we have not found it superior, and in fact it is inferior to many alloys of nickel silver and aluminum bronze. It does not possess the edge strength to withstand the stress of mastication and neither can it be used thinner than the alloys of nickel silver or aluminum bronze. In fact we have been using a band material from an alloy worked out by

Doctor H. C. Pollock, of St. Louis, which contains a high percentage of nickel and which is far superior to gold and platinum in every respect except color. This band material which Doctor Pollock has experimented with, takes on a color in the mouth similar to blue steel and beyond that point does not oxidize or corrode more than gold and platinum. This nickel band material stands up as well as iridio-platinum. It has been given a severe test in clinical cases.

The qualifications of a good band material as named by Doctor Pullen are (1) high fusing point; (2) noncorrosive and nonoxidizing; (3) a good edge strength; and (4) the capability of being easily burnished to the tooth.

Gold and platinum fails in all of these requirements except the fourth. That it succeeds in the fourth is the one reason why it fails in other requirements. Gold and platinum does not possess a fusing point sufficiently higher than the nickel alloys to give it any practical consideration. As regards noncorrosive and nonoxidizing, no band material exists which will not discolor in some mouths. We have seen iridio-platinum band material discolor in the mouths of patients, or at least some sort of deposit forms on the band material which is black. As regards edge strength, we have said before that gold and platinum alloy does not possess sufficient edge strength and is far inferior as regards edge strength, to nickel silver and especially those band materials containing a high percentage of nickel. As regards the fourth requirement, any band material that can be easily burnished to the tooth is too soft to stand the stress of mastication. We admit that a band can be made out of materials that burnish to the tooth, but after six or eight months of use in the mouth, subject to the various stresses of mastication, we find the band in a decidedly unsatisfactory condition.

As regards the statement that a band can be perfectly fitted and contoured, that is only a question of judgment, because we do not believe it is possible to ever "perfectly" fit a band. We believe a band material should be sufficiently rigid to make burnishing and contouring difficult, and the band can only be accurately fitted by the employment of a certain amount of skill and technical ability which comes only as a result of giving careful attention to details.

Any band material which is softer or which can be in contour more easily than iridio-platinum is too soft. Band materials having the working quality of iridio-platinum can be produced from nickel silver or alloys with a high percentage of nickel which is proved by the alloy that Doctor Pollock has produced.

In making a plea to standardize the construction of bands, we believe it is an unscientific thing to fit bands by trial. We are aware of the fact that a number of men have formed a habit of having a large stock of ready made bands, and selecting the band which goes over the tooth and seems to fit the most closely of any band they have in stock. Such a band will only attain a certain degree of accuracy.

In regard to the seam of the band, we do not believe that the seam of all

bands should be placed at the buccal side, but rather agree with Doctor Mershon's suggestion and practice, that the seam should be placed on the lingual side of the maxillary molar band, and on the buccal side of the mandibular molar band because of the anatomic shape of the teeth. Doctor Pullen's statements that at no point should the band be allowed to cover the occlusal surface may be misinterpreted. We believe that a band must fit the occlusal constriction in such a manner as to prevent the band from slipping gingivally and the amount of occlusal constriction on a molar is a portion of the occlusal surface. The necessity of having a band fit this occlusal constriction can be easily realized by studying the shape of a band swadged over a metal tooth. When band technic is standardized, we hope this standardization will not include the use of ready made bands which are to be condemned because they will lead to careless technic of band filling and while the use of a seamless band may be a time-saver, it will not be conducive to the best band technic. Before any one adopts the use of gold and platinum as the ideal band material from the standpoint of efficiency, we would suggest that they perfect a technic so that they can work iridio-platinum or alloys of the materials which have a high percentage of nickel. It will be found that a band made from either one of these last-named materials will have a higher degree of efficiency and usefulness than a gold and platinum band.

Dental Welfare Foundation

FOR a number of years men in the dental profession have considered the necessity of supplying dental information to the public in such a way as to show the evil effects of decayed teeth, and also of the benefits that could be secured to the general health by having the mouth and teeth in a good condition.

There is no doubt that it would be a desirable thing if a certain amount of dental information could be made available to the public so as to inform them of certain anatomical needs that are essential to the preservation of the teeth.

The public should have information regarding the deciduous teeth, as to the time of eruption and time of being lost, and also some information in regard to the permanent teeth, especially the eruption of the first permanent molar.

After a number of years of experience in dental clinics, we realize that many people do not know that the first permanent molar is a permanent tooth; consequently the tooth is decayed and lost before the parent is aware of the evil results that are being accomplished. Many mouths, from the standpoint of normal mastication, are ruined early in life because of the loss of this tooth.

This and other information which the public should have, has not been available up to the present time. The difficulty was that no suitable plan had been proposed or suggested for the dissemination of such knowledge without resorting to some means that are rather questionable from the professional standpoint.

The problem has been solved by the organization of the Dental Welfare

Foundation. They have perfected a plan, which has the sanction of the National Dental Association, for the spreading of dental information among the public that will not be a financial hardship on any one individual dentist, but which will be a benefit to the dental profession because of its wide distribution.

The plan of the Dental Welfare Foundation is being made known to dentists through the organization, and it only remains for us to endorse.

We believe the plan should be given a whole-hearted trial during the first year. At the end of that time, the profession will know whether it has met the success the organizers foresaw. If it has, everyone will be ready to support such educational work for many years to come.

ORTHODONTIC NEWS AND NOTES

The editors desire to make this department a permanent feature of the Journal, but in order to do so must have the full support of the orthodontic profession throughout the country. We would deem it a great favor if our subscribers and readers would send in such announcements as might be of interest to the profession.

The Fifth Red Cross Roll Call

Announcement has been made by the American Red Cross that it will hold its Fifth Annual Roll Call during the two weeks from the 11th to the 24th of November. During that time it will call upon the American people, collectively and individually, to join the organization as members. It will ask them to pay their dollars for the support of its peace-time work.

This work includes the establishment of health centers, the appointment of public health nurses, preparedness for Disaster Relief, instruction in First Aid, Food Selection, Life Saving and in Home Hygiene and Care of the Sick, and medical relief for the hundreds of thousands of destitute children in Central and Eastern Europe.

Not only is the Red Cross work with the standing Army and Navy being continued, but owing to the continually increasing number of disabled ex-service men, 2,397 Red Cross chapters are maintaining a service for ex-soldiers and sailors. There were last year 1,550,580 cases of service by chapters to such men, and headquarters handled 148,000 allotment, compensation and insurance claims. The Red Cross spent last year for the disabled men alone $10,000,000.

Yet it took in last year in dollar membership dues only $6,000,000. Obviously if the work is to be continued to meet the need that exists, the membership must be greatly increased during the forthcoming Roll Call. It is hoped that those who realize the value of public health work will make it their business to join and to persuade their friends to join some time between the dates mentioned.

Chicago Dental Society's Annual Clinic

The annual clinic of the Chicago Dental Society will be held at the magnificent new Hotel Drake, January 19, 20, 21, 1922.

This hotel is peculiarly well adapted to the needs of a large sectional meeting as has been planned for this occasion. Many commodious sound-proof rooms will be provided for the lectures and demonstrations, while the

space for the general sessions and exhibits will meet all requirements, and is ideal in every particular.

The program, which will be announced at a later date, will surpass anything yet attempted by this component society.

For convenience, out of town guests should make their reservations at the Drake, and they should be made as early as possible, as there will be a large attendance from outside Chicago. All ethical dentists are cordially invited.

Further information will be cheerfully given by addressing—M. M. Printz, Secretary, 25 E. Washington Street, Chicago.

Notes of Interest

Dr. Harvey A. Stryker formerly practicing in Rochester, N. Y., has located at Santa Ana, California, having just recently favorably completed the California State Board examination. He has offices in the Spurgeon Building.

Dr. A. V. Greenstein is located at 176 West 87th Street for the exclusive practice of orthodontia.

Dr. George A. Barker, formerly associated with Dr. H. L. Morehouse, Spokane, Washington, announces the opening of offices at 515 Joshua Green Building, Seattle, Washington, for the practice of orthodontia exclusively.

Dr. A. J. Labbe announces the opening of his office for exclusive practice of orthodontia, 419 South Capitol Ave., Lansing, Michigan.

Dr. Carl N. Dorman has associated with Dr. Carl O. Engstrom for the practice of orthodontia at 306 Hagelstein Building, Sacramento, California.

Dr. A. S. Ingman announces the opening of his offices, Suite 322-4 Francis Building, Louisville, Ky. Practice limited to orthodontia.

Dr. R. G. Brodeen announces the opening of a dental office at 925 Payne Ave., St. Paul, Minn., with Dr. V. L. Satterlund, physician and surgeon.